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William Radzevich, Remedial Project Manager
Engineering Field Activity West
Naval Facilities Engineering Command
San Bruno, California

ANALYSIS OF INTEGRATION OF PARCEL E REMEDIAL ALTERNATIVES AND PARCEL F REMEDIAL ALTERNATIVES

HUNTERS POINT SHIPYARD

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Prepared By

TETRA TECH EM INC.
135 Main Street, Suite 1800
San Francisco, CA 94105
(415) 543-4880

James Sickles

James Sickles, R.G., Project Manager

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1.0 INTRODUCTION

The purpose of this memorandum is to compare the Parcel E remedial alternatives with the Parcel F remedial alternatives and identify integration issues that would arise if remedial alternatives were selected and performed independently. The Parcel E Feasibility Study (FS) and the Parcel F FS for Hunters Point Shipyard (HPS) were prepared separately, and each has distinct alternatives that would impact the implementation of the alternatives in the other parcel (TtEMI 1998; TtEMI and Levine-Fricke-Recon 1998). The Parcel E FS identifies eight remedial alternatives (see Table 1), each of which addresses four remedial units: (1) the IR-01/21 and IR-02 Northwest debris zones, (2) IR-03, (3) miscellaneous soils, and (4) groundwater. The Parcel F FS identifies five remedial alternatives for addressing several sediment areas along the HPS shoreline (see Table 2). For the purposes of evaluation, only the Parcel F remediation areas that are located near Parcel E (Areas VIII, IX, and X) are considered during the analysis.

This memorandum has five sections including this introduction. Sections 2.0 and 3.0 present an analysis of integration issues for each of the Parcel E and Parcel F remedial alternatives. Sections 2.0 and 3.0 use the same analytical approach. Section 2.0 is organized by Parcel E alternatives and Section 3.0 is organized by Parcel F alternatives. Section 4.0 summarizes the major concerns that the regulatory agencies or community groups have expressed regarding the selection of remedial alternatives for Parcels E and F. Section 5.0 summarizes the major integration issues and discusses potential resolutions. Tables 1 and 2 present the Parcel E and F remedial alternatives, respectively. Table 3 presents a summary of the integration analysis. It should be noted that the alternatives have been renamed to include the parcel designation. For example, Alternative 1 from the Parcel E FS report is now Alternative E-1.

While the analysis presented in this memorandum may present the same issues multiple times, the memorandum was prepared to allow for understanding of each combination independent of the rest of the discussion in this memorandum. It should be noted that in several instances the issue of "implementation of the second remedy may affect or destroy portions of the first remedy" is discussed. The purpose is to indicate that the Parcel E and F remedial alternatives need to be considered simultaneously. The Navy recognizes that it would be inappropriate to implement a remedy that

"destroys" a prior selected remedy, unless such action somehow reduces the overall costs of the remediation without an adverse impact on protectiveness.

Attached at the end of this memorandum are figures presenting each of the Parcel E and Parcel F alternatives.

2.0 INTEGRATION ANALYSIS BY PARCEL E ALTERNATIVES

In the following subsections, each of the Parcel E remedial alternatives is compared with each of the Parcel F remedial alternatives to identify potential integration issues. Each subsection includes a discussion of integration issues common to all alternative combinations as well as combination-specific issues.

2.1 ALTERNATIVE E-1: NO ACTION

General Overview of Compatibility Issues for Alternative E-1: When implementing Alternative E-1 with any of the Parcel F alternatives, three potential issues must be considered: (1) contamination from Parcel E could migrate into San Francisco Bay (the Bay) and potentially recontaminate the Parcel F sediments and the Bay, and (2) contamination from other offsite sources could migrate into the Bay and potentially recontaminate the Parcel F sediments, and (3) the Parcel F optional shoreline source control measures would be conducted in contaminated areas.

2.1.1 Integration of Alternative E-1 and Alternative F-1

Alternatives E-1 and F-1 are the no action alternatives for both parcels. Implementation of both of these alternatives would be compatible with the other and not create any logistical or scheduling conflicts. However, contaminant migration from Parcel E to Parcel F would not be prevented.

2.1.2 Integration of Alternative E-1 and Alternative F-2

This combination of alternatives is fairly compatible. Alternative F-2 consists of removing the sediments from Areas VIII and IX, and placing the dredged sediments on Area X, which would then be capped in-place. An on-site wetlands would be created on top of the capped area. In addition to the issues common to all Alternative E-1 combinations, Alternative F-2 involves creating an on-site wetlands in Area X, which could be affected by contaminant migration from Parcel E and other offsite sources.

2.1.3 Integration of Alternative E-1 and Alternative F-3

This combination of alternatives is fairly compatible. Under the F-3 alternative, all the sediment from Areas VIII, IX, and X would be removed and placed in the confined disposal facility (CDF) at the dry docks. No additional integration issues exist beyond those described as common to all Alternative E-1 combinations.

2.1.4 Integration of Alternative E-1 and Alternative F-4

This combination of alternatives is fairly compatible. Under the F-4 alternative, optional shoreline source control measures will be implemented and the dredged sediment would be removed and transported to the rehandling facilities on Parcels D and E for dewatering and stabilization prior to off-site disposal. Alternative F-4 assumes that the Parcel E areas will be remediated prior to being used as rehandling facilities for dewatering the dredged sediments in drying ponds. However, with this combination of alternatives, the soil remaining in Parcel E will not be remediated. Therefore appropriate precautions will need to be taken when constructing the drying ponds in the contaminated areas. In summary, the potential issue, in addition to the issues identified in the Alternative E-1 general overview, is the presence of contaminated Parcel E soils where the Parcel F drying ponds are to be located.

2.1.5 Integration of Alternative E-1 and Alternative F-5

This combination of alternatives is fairly compatible. The potential issues to be considered are discussed in the general overview of Alternative E-1. The difference with Alternative F-5 is that an on-site wetlands that will be created in Area X could be affected by contaminant migration from Parcel E and other offsite sources.

2.2 ALTERNATIVE E-2: DEED RESTRICTIONS, COMBINED MULTILAYER CAP AT IR-01/21 AND IR-02 NORTHWEST DEBRIS ZONES, MULTILAYER CAP AT IR-03, SINGLE-LAYER CAP ON THE REMAINDER OF PARCEL E, SHEETPILE OR SLURRY WALL AROUND PARCEL E

General Overview of Compatibility Issues for Alternative E-2: When implementing Alternative E-2 with any of the Parcel F alternatives (except Alternative F-1), potential issues must be considered that are common to all alternative combinations: (1) the installation of the Parcel E sheetpile wall, (2) the dredging of Parcel F in Areas VIII, IX, and X, (3) the optional shoreline source control measures, and (4) the contamination from other offsite sources may recontaminate the sediments and the Bay. Most of

these components will be constructed or implemented along the Parcel E shoreline; therefore, the construction of one component affects the others as discussed below.

The Parcel E sheetpile wall is proposed for construction approximately 20 feet offshore for the entire shoreline length of Parcel E. One concern is that if the Parcel E remedy is performed first, appropriate dredging techniques would need to be used when implementing Parcel F so that the dredging of Parcel F areas VIII, IX, and X would not affect the Parcel E sheetpile wall. Also, if the sheetpile wall is constructed first, the Parcel F optional shoreline source control measures would not be implemented because the Parcel E sheetpile wall will enclose the existing shoreline and prevent Parcel E contamination from migrating to Parcel F.

Another consideration is the sequencing which could be inefficient and costly if the Parcel F remedial alternative, including the optional shoreline source control measures, is conducted first and then the Parcel E remedy, including constructing multilayer and single-layer caps and the sheetpile wall, is implemented. Implementation of this combination would not be cost effective, since the shoreline source control measures would be covered by the cap, and the sheetpile wall would be constructed downgradient of the shoreline improvements. So more work would be performed at a higher cost without significant benefit to the environment.

In general, none of these issues would eliminate the selection of an alternative. Each parcel remedy could be implemented separately; however, implementation of the second remedy may affect or destroy portions of the first remedy. Therefore, it would be beneficial if the remedial alternatives could be designed and constructed at the same time or at least designed together and planned so that the construction of one remedy does not interfere with or damage the other.

2.2.1 Integration of Alternative E-2 and Alternative F-1

Alternatives E-2 and F-1 are compatible. The shoreline sheetpile wall installed as part of Alternative E-2 would contain some of the contaminated Parcel F sediments in Areas VIII, IX, and X, and would prevent Parcel E contaminants from migrating to Parcel F. No schedule or logistical conflicts exist because no action would be taken at Parcel F.

2.2.2 Integration of Alternative E-2 and Alternative F-2

Alternatives E-2 and F-2 are compatible. In addition to the issues common to all Alternative E-2 combinations, if Alternative E-2 is implemented first, the shoreline sheetpile wall would contain some of the contaminated Parcel F sediments in Areas VIII and IX, and limit the area available for creating a wetland in Area X.

If Alternative F-2 is implemented first, the Parcel F optional shoreline source control measures, and dredged parts of Areas VIII and IX and created wetland at Area X could become recontaminated by migrating Parcel E contaminants and other offsite sources and would ultimately be backfilled and contained within the Parcel E shoreline sheetpile wall. In effect, the Parcel F activities would act as interim cleanup actions.

2.2.3 Integration of Alternative E-2 and Alternative F-3

Alternatives E-2 and F-3 are the most compatible of the possible Alternative E-2 combinations. In addition to the issues common to all Alternative E-2 combinations, if Alternative E-2 is implemented first, the shoreline sheetpile wall would contain some of the contaminated Parcel F sediments in Areas VIII, IX, and X.

If Alternative F-3 is implemented first, the Parcel F optional shoreline source control measures, and dredged parts of Areas VIII, IX, and X could become recontaminated by migrating Parcel E contaminants and other offsite sources and would ultimately be backfilled and contained within the Parcel E shoreline sheetpile wall. In effect, the Parcel F activities would act as interim cleanup actions.

2.2.4 Integration of Alternative E-2 and Alternative F-4

This combination of alternatives would be fairly difficult to implement due to the presence of the single-layer cap on Parcel E in the areas of the proposed Parcel F rehandling facility drying ponds. Alternative F-4 assumes that the Parcel E areas will be remediated prior to being used as rehandling facilities for dewatering the dredged sediments in drying ponds. However, with this combination of alternatives, the soil remaining in Parcel E will be covered with a single-layer cap which is not conducive to constructing the drying ponds in the these areas. Therefore, this combination of alternatives would not be compatible.

2.2.5 Integration of Alternative E-2 and Alternative F-5

Alternatives E-2 and F-5 are compatible. In addition to the issues common to all Alternative E-2 combinations, if Alternative E-2 is implemented first, the shoreline sheetpile wall would contain some of the contaminated Parcel F sediments in Areas VIII and IX, and limit the area available for creating a wetland in Area X.

If Alternative F-5 is implemented first, the Parcel F optional shoreline source control measures, and dredged parts of Areas VIII and IX and created wetland at Area X could become recontaminated by migrating Parcel E contaminants and other offsite sources and would ultimately be backfilled and contained within the Parcel E shoreline sheetpile wall. In effect, the Parcel F activities would act as interim cleanup actions.

2.3 ALTERNATIVE E-3: DEED RESTRICTIONS, MULTILAYER CAP AT IR-01/21 AND IR-02 NORTHWEST DEBRIS ZONES, MULTILAYER CAP, SHEETPILE WALL AND DUAL PHASE EXTRACTION AT IR-03, EXCAVATION OF PARCEL E MISCELLANEOUS SOILS AND PLACEMENT AT IR-01/21 AND IR-02 NORTHWEST, SHEETPILE WALL AND INTERCEPTOR TRENCH ALONG THE SHORELINE, ENCAPSULATION OF GROUNDWATER AREAS EXCEEDING CRITERIA (AEC), NATURAL ATTENUATION, DISCHARGE OF GROUNDWATER TO BAY OR CONSTRUCTED WETLAND, GROUNDWATER MONITORING.

General Overview of Compatibility Issues for Alternative E-3: When implementing Alternative E-3 with any of the Parcel F alternatives (except Alternative F-1), potential issues must be considered that are common to all alternative combinations: (1) the installation of the Parcel E sheetpile wall and interceptor trench, (2) the dredging of Parcel F in Areas VIII, IX, and X, (3) the optional shoreline source control measures, and (4) the contamination from other offsite sources may recontaminate the sediments and the Bay. Most of these components will be constructed or implemented along the Parcel E shoreline; therefore, the construction of one component affects the others as discussed below.

The Parcel E sheetpile wall and interceptor trench is proposed for construction approximately 20 feet offshore and is proposed for the entire shoreline length of Parcel E. One concern is that if the Parcel E remedy is performed first, appropriate dredging techniques would need to be used when implementing Parcel F so that the dredging of Parcel F areas VIII, IX, and X would not affect the sheetpile wall and interceptor trench. Also, if the sheetpile wall and interceptor trench are constructed first, the Parcel F

optional shoreline source control measures would not be implemented because the Parcel E sheetpile wall will enclose the existing shoreline and prevent Parcel E contamination from migrating to Parcel F.

Another consideration is the sequencing, which could be inefficient and costly if the Parcel F remedial alternative, including the optional shoreline source control measures, is conducted first and then the Parcel E remedy, including constructing the multilayer cap and the sheetpile wall and interceptor trench, is implemented. Implementation of this combination would not be cost effective, since the shoreline source control measures would be covered by the cap, and the sheetpile wall and interceptor trench would be constructed downgradient of the shoreline improvements. So more work would be performed at a higher cost without significant benefit to the environment.

In general, none of these issues would eliminate the selection of an alternative. Each parcel remedy could be implemented separately, however, implementation of the second remedy may affect or destroy portions of the first remedy. Therefore, as stated previously it would be beneficial if the remedial alternatives could be designed and constructed at the same time or at least designed together and planned so that the construction of one remedy does not interfere with or damage the other.

2.3.1 Integration of Alternative E-3 and Alternative F-1

Alternatives E-3 and F-1 are compatible. The shoreline sheetpile wall and interceptor trench, installed as part of Alternative E-3 would contain some of the contaminated Parcel F sediments in Areas VIII, IX, and X, and would prevent Parcel E contaminants from migrating to Parcel F. No schedule or logistical conflicts exist because no action would be taken at Parcel F.

2.3.2 Integration of Alternative E-3 and Alternative F-2

Alternatives E-3 and F-2 are compatible. In addition to the issues common to all Alternative E-3 combinations, if Alternative E-3 is implemented first, the shoreline sheetpile wall and interceptor trench would contain some of the contaminated Parcel F sediments in Areas VIII and IX, and limit the area available for creating a wetland in Area X.

If Alternative F-2 is implemented first, the Parcel F optional shoreline source control measures, and dredged parts of Areas VIII and IX and created wetland at Area X could become recontaminated by migrating Parcel E contaminants and other offsite sources and would ultimately be backfilled and

contained within the Parcel E shoreline sheetpile wall. In effect, the Parcel F activities would act as interim cleanup actions.

2.3.3 Integration of Alternative E-3 and Alternative F-3

Alternatives E-3 and F-3 are the most compatible of the possible Alternative E-3 combinations. In addition to the issues common to all Alternative E-3 combinations, if Alternative E-3 is implemented first, the shoreline sheetpile wall would contain some of the contaminated Parcel F sediments in Areas VIII, IX, and X.

If Alternative F-3 is implemented first, the Parcel F optional shoreline source control measures, and dredged parts of Areas VIII, IX, and X could become recontaminated by migrating Parcel E contaminants and other offsite sources and would ultimately be backfilled and contained within the Parcel E shoreline sheetpile wall. In effect, the Parcel F activities would act as interim cleanup actions.

2.3.4 Integration of Alternative E-3 and Alternative F-4

This combination of alternatives would be more difficult to implement than the other Alternative E-3 combinations. The remediation of the Parcel E miscellaneous soils would need to be completed prior to constructing the drying ponds for the Parcel F dredged sediment dewatering areas (and before dredging the sediments). This scenario would require that the Parcel E remedy be in place prior to starting the Parcel F remedy or that the remedies be conducted simultaneously.

2.3.5 Integration of Alternative E-3 and Alternative F-5

Alternatives E-3 and F-5 are compatible. In addition to the issues common to all Alternative E-3 combinations, if Alternative E-3 is implemented first, the shoreline sheetpile wall and interceptor trench would contain some of the contaminated Parcel F sediments in Areas VIII and IX, and limit the area available for creating a wetland in Area X.

If Alternative F-5 is implemented first, the Parcel F optional shoreline source control measures, and dredged parts of Areas VIII and IX and created wetland at Area X could become recontaminated by migrating Parcel E contaminants and would ultimately be backfilled and contained within the Parcel E shoreline sheetpile wall and interceptor trench. In effect, the Parcel F activities would act as interim cleanup actions.

2.4 ALTERNATIVE E-4: DEED RESTRICTIONS, MULTILAYER CAP AT IR-01/21 AND IR-02 NORTHWEST DEBRIS ZONES, EXCAVATION AND OFF-SITE DISPOSAL OF VISIBLY CONTAMINATED IR-03 SOIL, SKIMMING AND OFF-SITE RECYCLING OF LNAPL AT IR-03, EXCAVATION OF OTHER IR-03 SOILS AND PARCEL E MISCELLANEOUS SOILS AND PLACEMENT AT IR-01/21 AND IR-02 NORTHWEST, SHEETPILE WALL AND INTERCEPTOR TRENCH ALONG THE SHORELINE, ENCAPSULATION OF GROUNDWATER AECS, NATURAL ATTENUATION, DISCHARGE OF GROUNDWATER TO BAY OR CONSTRUCTED WETLAND, GROUNDWATER MONITORING.

General Overview of Compatibility Issues for Alternative E-4: When implementing Alternative E-4 with any of the Parcel F alternatives (except Alternative F-1), five potential issues must be considered that are common to all alternative combinations: (1) the installation of the Parcel E sheetpile wall and interceptor trench, (2) the dredging of Parcel F in Areas VIII, IX, and X, (3) the optional shoreline source control measures, (4) the excavation of IR-03 soils, and (5) the contamination from other offsite sources may recontaminate the sediments and the Bay. Most of these components will be constructed or implemented along the Parcel E shoreline; therefore, the construction of one component affects the others as discussed below.

The Parcel E sheetpile wall and interceptor trench is proposed for construction approximately 20 feet offshore for the entire shoreline length of Parcel E. One concern is that if the Parcel E remedy is performed first, appropriate dredging techniques would need to be used when implementing the Parcel F remedy so that the dredging of Parcel F areas VIII, IX, and X would not affect the sheetpile wall and interceptor trench. Also, if the sheetpile wall and interceptor trench are constructed first, the Parcel F optional shoreline source control measures would not need to be implemented because the Parcel E sheetpile wall will enclose the existing shoreline and prevent Parcel E contamination from migrating to Parcel F.

Another consideration would be the cost effectiveness if the Parcel F remedial alternative including the optional shoreline source control measures is conducted first, and then the Parcel E remedy including constructing the multilayer cap, the sheetpile wall and interceptor trench, and conducting excavation activities at IR-03 is implemented. Implementation of this combination would not be cost effective, since the shoreline source control measures would be covered by the cap, and the sheetpile wall and interceptor trench would be constructed downgradient of the shoreline improvements. In addition, in the area of IR-03 the installation of the shoreline improvements would encounter light nonaqueous phase liquids (LNAPL), and appropriate actions would need to be taken to ensure that the area was contained

sufficiently. By implementing the Parcel F remedial alternative before Alternative E-4, additional work would be performed at a higher cost without significant benefit to the environment.

In general, none of these issues would eliminate the selection of an alternative. Each parcel remedy could be implemented separately; however, implementation of the second remedy may affect or destroy portions of the first remedy.

2.4.1 Integration of Alternative E-4 and Alternative F-1

Alternatives E-4 and F-1 are compatible. The shoreline sheetpile wall and interceptor trench, installed as part of Alternative E-4 would contain some of the contaminated Parcel F sediments in Areas VIII, IX, and X, and would prevent Parcel E contaminants from migrating to Parcel F. No schedule or logistical conflicts exist because no action would be taken at Parcel F.

2.4.2 Integration of Alternative E-4 and Alternative F-2

Alternatives E-4 and F-2 are compatible. In addition to the issues common to all Alternative E-4 combinations, if Alternative E-4 is implemented first, the shoreline sheetpile wall and interceptor trench would contain some of the contaminated Parcel F sediments in Areas VIII and IX, and limit the area available for creating a wetland in Area X.

If Alternative F-2 is implemented first, the Parcel F optional shoreline source control measures, and dredged parts of Areas VIII and IX and created wetland at Area X could become recontaminated by migrating Parcel E contaminants and other offsite sources and would ultimately be backfilled and contained within the Parcel E shoreline sheetpile wall. In effect, the Parcel F activities would act as interim cleanup actions.

2.4.3 Integration of Alternative E-4 and Alternative F-3

Alternatives E-4 and F-3 are the most compatible of the possible Alternative E-4 combinations. In addition to the issues common to all Alternative E-4 combinations, if Alternative E-4 is implemented first, the shoreline sheetpile wall would contain some of the contaminated Parcel F sediments in Areas VIII, IX, and X.

If Alternative F-3 is implemented first, the Parcel F optional shoreline source control measures, and dredged parts of Areas VIII, IX, and X could become recontaminated by migrating Parcel E

contaminants and would ultimately be backfilled and contained within the Parcel E shoreline sheetpile wall. In effect, the Parcel F activities would act as interim cleanup actions.

2.4.4 Integration of Alternative E-4 and Alternative F-4

This combination of alternatives would be more difficult to implement than the other E-4 alternative combinations. The remediation of the miscellaneous Parcel E soils would need to be completed prior to constructing the drying ponds for the Parcel F dredged sediment dewatering areas (and before dredging the sediments). This scenario would require that the Parcel E remedy be in place prior to starting the Parcel F remedy or that the remedies be conducted simultaneously.

2.4.5 Integration of Alternative E-4 and Alternative F-5

Alternatives E-4 and F-5 are compatible. In addition to the issues common to all Alternative E-4 combinations, if Alternative E-4 is implemented first, the shoreline sheetpile wall and interceptor trench would contain some of the contaminated Parcel F sediments in Areas VIII and IX, and limit the area available for creating a wetland in Area X.

If Alternative F-5 is implemented first, the Parcel F optional shoreline source control measures and dredged parts of Areas VIII and IX and created wetland at Area X could become recontaminated by migrating Parcel E contaminants and other offsite sources and would ultimately be backfilled and contained within the Parcel E shoreline sheetpile wall and interceptor trench. In effect, the Parcel F activities would act as interim cleanup actions.

2.5 ALTERNATIVE E-5: DEED RESTRICTIONS, MULTILAYER CAP AT IR-01/21 AND IR-02 NORTHWEST DEBRIS ZONES, EXCAVATION AND THERMAL DESORPTION AND/OR SOLIDIFICATION/STABILIZATION TREATMENT OF IR-03 AND MISCELLANEOUS SOILS AND PLACEMENT AT IR-01/21 AND IR-02 NORTHWEST, SKIMMING AND OFF-SITE RECYCLING OF LNAPL AT IR-03, SHEETPILE WALL AND INTERCEPTOR TRENCH ALONG THE SHORELINE, NATURAL ATTENUATION, ON-SITE PRETREATMENT OF COLLECTED GROUNDWATER AND DISCHARGE TO THE PUBLICLY OWNED TREATMENT WORKS (POTW), GROUNDWATER MONITORING.

General Overview of Compatibility Issues for Alternative E-5: When implementing Alternative E-5 with any of the Parcel F alternatives (except Alternative F-1), six potential issues must be considered that are common to all alternative combinations: (1) the installation of the Parcel E sheetpile wall and interceptor trench, (2) the dredging of Parcel F in Areas VIII, IX, and X, (3) the optional shoreline source

control measures, (4) on-site treatment of IR-03 and miscellaneous soils and subsequent placement on IR-01/21 prior to capping, (5) the excavation of IR-03 soils, and (6) the contamination from other offsite sources may recontaminate the sediments and the Bay. Most of these components will be constructed or implemented along the Parcel E shoreline; therefore, the construction of one component affects the others as discussed below.

The Parcel E sheetpile wall and interceptor trench is proposed for construction approximately 20 feet offshore for the entire shoreline length of Parcel E. One concern is that if the Parcel E remedy is performed first, appropriate dredging techniques would need to be used when implementing the Parcel F remedy so the dredging of Parcel F areas VIII, IX, and X would not affect the sheetpile wall and interceptor trench. Also, if the sheetpile wall and interceptor trench are constructed first, the Parcel F optional shoreline source control measures would not be implemented because the Parcel E sheetpile wall will enclose the existing shoreline and prevent Parcel E contamination from migrating to Parcel F.

Another consideration is the cost effectiveness if the Parcel F remedial alternative, including the optional shoreline source control measures, is conducted first, and then the Parcel E remedy including constructing the multilayer cap, the sheetpile wall and interceptor trench, and conducting excavation activities at IR-03, is implemented. Implementation of this combination would not be cost effective, since the shoreline source control measures would be covered by the cap, and the sheetpile wall and interceptor trench would be constructed downgradient of the shoreline improvements. In addition, in the area of IR-03, the installation of the shoreline improvements would encounter LNAPLs and appropriate actions would need to be taken to ensure that the area was contained sufficiently. By implementing the Parcel F remedial alternative before Alternative E-5, additional work would be performed at a higher cost without significant benefit to the environment.

It should be noted that Alternative E-5 is a difficult alternative to implement, due to the on-site treatment of soils and subsequent placement of the soils on IR-01/21 and IR-02 Northwest. This alternative can be achieved but it will take longer than any of the other Parcel E alternatives.

In general, none of these issues would eliminate the selection of an alternative. Each parcel remedy could be implemented separately, however, implementation of the second remedy may affect or destroy portions of the first remedy.

2.5.1 Integration of Alternative E-5 and Alternative F-1

Alternatives E-5 and F-1 are compatible. The shoreline sheetpile wall and interceptor trench, installed as part of Alternative E-5, would contain some of the contaminated Parcel F sediments in Areas VIII, IX, and X, and would prevent Parcel E contaminants from migrating to Parcel F. No schedule or logistical conflicts exist because no action would be taken at Parcel F.

2.5.2 Integration of Alternative E-5 and Alternative F-2

Alternatives E-5 and F-2 are compatible. In addition to the issues common to all Alternative E-5 combinations, if Alternative E-5 is implemented first, the shoreline sheetpile wall and interceptor trench would contain some of the contaminated Parcel F sediments in Areas VIII and IX, and limit the area available for creating a wetland in Area X.

If Alternative F-2 is implemented first, the Parcel F optional shoreline source control measures, and dredged parts of Areas VIII and IX and created wetland at Area X could become recontaminated by migrating Parcel E contaminants and other offsite sources and would ultimately be backfilled and contained within the Parcel E shoreline sheetpile wall. In effect, the Parcel F activities would act as interim cleanup actions.

2.5.3 Integration of Alternative E-5 and Alternative F-3

Alternatives E-5 and F-3 are the most compatible of the possible Alternative E-5 combinations. In addition to the issues common to all Alternative E-5 combinations, if Alternative E-5 is implemented first, the shoreline sheetpile wall would contain some of the contaminated Parcel F sediments in Areas VIII, IX, and X.

If Alternative F-3 is implemented first, the Parcel F optional shoreline source control measures, and dredged parts of Areas VIII, IX, and X could become recontaminated by migrating Parcel E contaminants and would ultimately be backfilled and contained within the Parcel E shoreline sheetpile wall. In effect, the Parcel F activities would act as interim cleanup actions.

2.5.4 Integration of Alternative E-5 and Alternative F-4

This combination of alternatives would be more difficult to implement than the other E-5 alternative combinations. Alternative E-5 includes the on-site treatment by thermal desorption and

solidification/stabilization of Parcel E miscellaneous soils and subsequent placement of the treated soil at the IR-01/21 and IR-02 Northwest debris zones. The remediation of the Parcel E miscellaneous soils would need to be completed prior to constructing the drying ponds for the Parcel F dredged sediment dewatering areas (and before dredging the sediments). This scenario would require that the Parcel E remedy be in place prior to starting the Parcel F remedy or that the remedies be implemented simultaneously, and would delay the beginning of the construction of dewatering facilities and dredging activities under the Parcel F alternative.

2.5.5 Integration of Alternative E-5 and Alternative F-5

Alternatives E-5 and F-5 are compatible. In addition to the issues common to all Alternative E-5 combinations, if Alternative E-5 is implemented first, the shoreline sheetpile wall and interceptor trench would contain some of the contaminated Parcel F sediments in Areas VIII and IX, and limit the area available for creating a wetland in Area X.

If Alternative F-5 is implemented first, the Parcel F optional shoreline source control measures, and dredged parts of Areas VIII and IX and created wetland at Area X could become recontaminated by migrating Parcel E contaminants and other offsite sources and would ultimately be backfilled and contained within the Parcel E shoreline sheetpile wall and interceptor trench. In effect, the Parcel F activities would act as interim cleanup actions.

2.6 ALTERNATIVE E-6: DEED RESTRICTIONS, MULTILAYER CAP AT IR-01/21 AND IR-02 NORTHWEST DEBRIS ZONES, EXCAVATION OF IR-03 AND MISCELLANEOUS SOILS AND OFF-SITE DISPOSAL, SKIMMING AND OFF-SITE RECYCLING OF LNAPL AT IR-03, SHEETPILE WALL AND INTERCEPTOR TRENCH ALONG THE SHORELINE, ON-SITE PRETREATMENT OF COLLECTED GROUNDWATER AND DISCHARGE TO THE POTW, GROUNDWATER MONITORING.

General Overview of Compatibility Issues for Alternative E-6: When implementing Alternative E-6 with any of the Parcel F alternatives (except Alternative F-1), five potential issues must be considered that are common to all alternative combinations: (1) the installation of the Parcel E sheetpile wall and interceptor trench, (2) the dredging of Parcel F in Areas VIII, IX, and X, (3) the optional shoreline source control measures, (4) the excavation of IR-03 soils and other sites adjacent to the Bay, and (5) the contamination from other offsite sources may recontaminate the sediments and the Bay. Most of these components will be constructed or implemented along the Parcel E shoreline; therefore, the construction of one component affects the others as discussed below.

The Parcel E sheetpile wall and interceptor trench is proposed for construction approximately 20 feet offshore for the entire shoreline length of Parcel E. One concern is that if the Parcel E remedy is performed first, appropriate dredging techniques would need to be used when implementing the Parcel F remedy so the dredging of Parcel F areas VIII, IX, and X would not affect the sheetpile wall and interceptor trench. Also, if the sheetpile wall and interceptor trench are constructed first, the Parcel F optional shoreline source control measures would not be implemented because the Parcel E sheetpile wall will enclose the existing shoreline and prevent Parcel E contamination from migrating to Parcel F.

Another consideration is the cost effectiveness if the Parcel F remedial alternative, including the optional shoreline source control measures, is conducted first and then the Parcel E remedy, including constructing the multilayer cap, the sheetpile wall and interceptor trench, and conducting excavation activities at IR-03 and other sites adjacent to the Bay is implemented. Implementation of this combination would not be cost effective because the shoreline source control measures would be covered by the cap, and the sheetpile wall and interceptor trench would be constructed downgradient of the shoreline improvements. In addition, in the area of IR-03, the installation of the shoreline improvements would encounter LNAPLs and appropriate actions would need to be taken to ensure that the area was contained sufficiently. By implementing the Parcel F remedial alternative before Alternative E-6, additional work would be performed at a higher cost without significant benefit to the environment.

In general, none of these issues would eliminate the selection of an alternative. Each parcel remedy could be implemented separately, however, the second remedy implemented may affect or destroy portions of the first remedy.

2.6.1 Integration of Alternative E-6 and Alternative F-1

Alternatives E-6 and F-1 are compatible. The shoreline sheetpile wall and interceptor trench, installed as part of Alternative E-6 would contain some of the contaminated Parcel F sediments in Areas VIII, IX, and X, and would prevent Parcel E contaminants from migrating to Parcel F. No schedule or logistical conflicts exist because no action would be taken at Parcel F.

2.6.2 Integration of Alternative E-6 and Alternative F-2

Alternatives E-6 and F-2 are compatible. In addition to the issues common to all Alternative E-6 combinations, if Alternative E-6 is implemented first, the shoreline sheetpile wall and interceptor trench

would contain some of the contaminated Parcel F sediments in Areas VIII and IX, and limit the area available for creating a wetland in Area X.

If Alternative F-2 is implemented first, the Parcel F optional shoreline source control measures, and dredged parts of Areas VIII and IX and created wetland at Area X could become recontaminated by migrating Parcel E contaminants and other offsite sources and would ultimately be backfilled and contained within the Parcel E shoreline sheetpile wall. In effect, the Parcel F activities would act as interim cleanup actions.

2.6.3 Integration of Alternative E-6 and Alternative F-3

Alternatives E-6 and F-3 are the most compatible of the possible Alternative E-6 combinations. In addition to the issues common to all Alternative E-6 combinations, if Alternative E-6 is implemented first, the shoreline sheetpile wall would contain some of the contaminated Parcel F sediments in Areas VIII, IX, and X.

If Alternative F-3 is implemented first, the Parcel F optional shoreline source control measures, and dredged parts of Areas VIII, IX, and X could become recontaminated by migrating Parcel E contaminants and would ultimately be backfilled and contained within the Parcel E shoreline sheetpile wall. In effect, the Parcel F activities would act as interim cleanup actions.

2.6.4 Integration of Alternative E-6 and Alternative F-4

This combination of alternatives would be more difficult to implement than the other E-6 alternative combinations. The remediation of the miscellaneous Parcel E soils would need to be completed prior to constructing the drying ponds for the Parcel F dredged sediment dewatering areas (and before dredging the sediments). This scenario would require that the Parcel E remedy be in place prior to starting the Parcel F remedy or that the remedies be implemented simultaneously, and would delay the beginning of the construction of dewatering facilities and dredging activities under the Parcel F alternative.

2.6.5 Integration of Alternative E-6 and Alternative F-5

Alternatives E-6 and F-5 are compatible. In addition to the issues common to all Alternative E-6 combinations, if Alternative E-6 is implemented first, the shoreline sheetpile wall and interceptor trench would contain some of the contaminated Parcel F sediments in Areas VIII and IX, and limit the area available for creating a wetland in Area X.

If Alternative F-5 is implemented first, the Parcel F optional shoreline source control measures, and dredged parts of Areas VIII and IX and created wetland at Area X could become recontaminated by migrating Parcel E contaminants and other offsite sources and would ultimately be backfilled and contained within the Parcel E shoreline sheetpile wall and interceptor trench. In effect, the Parcel F activities would act as interim cleanup actions.

2.7 ALTERNATIVE E-7: DEED RESTRICTIONS, MULTILAYER CAP AND SHEETPILE WALL AT IR-01/21 AND IR-02 NORTHWEST DEBRIS ZONES, EXCAVATION AND OFF-SITE DISPOSAL OF VISIBLY CONTAMINATED IR-03 SOIL, SKIMMING AND OFF-SITE RECYCLING OF LNAPL AT IR-03, EXCAVATION OF MISCELLANEOUS SOILS AND GROUNDWATER AEC SATURATED SOILS AND PLACEMENT AT IR-01/21 AND IR-02 NORTHWEST, COLLECTION, PRETREATMENT, AND DISCHARGE OF AEC GROUNDWATER TO POTW, GROUNDWATER MONITORING.

General Overview of Compatibility Issues for Alternative E-7: When implementing Alternative E-7 with any of the Parcel F alternatives (except Alternative F-1), six potential issues must be considered that are common to all alternative combinations: (1) the installation of the Parcel E sheetpile wall at IR-01/21 and IR-02 and the existing sheet pile wall at IR-03, (2) the dredging of Parcel F in Areas VIII, IX, and X, (3) the multilayer cap being constructed on IR-01/21 and IR-02 Northwest, (4) the optional shoreline source control measures, (5) the excavation of saturated soils in the groundwater AECs, the IR-03 soils, and other sites adjacent to the Bay, and (6) the contamination from other offsite sources may recontaminate the sediments and the Bay. Most of these components will be constructed or implemented along the Parcel E shoreline; therefore, the construction of one component affects the others as discussed below.

The IR-01/21 and IR-02 Northwest sheetpile wall is proposed for construction approximately 20 feet offshore. It should be noted that the sheetpile wall encompasses a much smaller area compared to Alternatives E-2 through E-6. One concern is that if the Parcel E remedy is performed first, appropriate dredging techniques would need to be used so that the sediment dredging would not affect the sheetpile wall. If the sheetpile wall is constructed first, the Parcel F optional shoreline source control measures will not be implemented in that area.

In addition, the construction or the integrity of the multilayer cap on IR-01/21 and IR-02 Northwest could potentially be affected by implementing the optional shoreline source control measures and the sediment dredging to be done adjacent to the cap, depending on which parcel is remediated first. Also,

the IR-03 soils, as well as soils adjacent to the Bay will be excavated which may be affected by dredging activities or the shoreline source control measures due to the proximity of IR-03 to the shoreline.

In general, none of these issues would eliminate the selection of an alternative. Each parcel remedy could be implemented separately, however, implementation of the second remedy may affect or destroy portions of the first remedy.

2.7.1 Integration of Alternative E-7 and Alternative F-1

Alternatives E-7 and F-1 are compatible. The shoreline sheetpile wall along IR-01/21 and IR-02 northwest installed as part of Alternative E-7 would contain some of the contaminated Parcel F sediments in Areas VIII, IX, and X, and would prevent some of the Parcel E contaminants from migrating to Parcel F. No schedule or logistical conflicts exist because no action would be taken at Parcel F.

2.7.2 Integration of Alternative E-7 and Alternative F-2

This combination of alternatives is fairly compatible. If Alternative E-7 is constructed first the IR-01/21 sheetpile wall takes away some of the space available for the Area X wetland but the wetland could be expanded onto the western portion of IR-01/21. The IR-01/21 cap will be tied into the sheetpile wall that will encompass the shoreline riprap so the Parcel F shoreline source control will not be needed where the sheetpile wall is constructed but will be necessary along the remainder of the Parcel E shoreline.

If Alternative F-2 is implemented first, it would be necessary to coordinate wetland design and construction with the IR-01/21 sheetpile wall to minimize wetland destruction.

2.7.3 Integration of Alternative E-7 and Alternative F-3

Alternatives E-7 and F-3 are the most compatible of the possible Alternative E-7 combinations. In addition to the issues common to all Alternative E-7 combinations, if Alternative E-7 is implemented first, the shoreline sheetpile wall would contain some of the contaminated Parcel F sediments in Area X.

If Alternative F-3 is implemented first, the Parcel F optional shoreline source control measures, and dredged parts of Areas VIII, IX, and X could become recontaminated by migrating Parcel E contaminants and Area X would ultimately be backfilled and contained within the IR-01/21 sheetpile wall. In effect, the Parcel F activities would act as interim cleanup actions.

2.7.4 Integration of Alternative E-7 and Alternative F-4

This combination of alternatives would be more difficult to implement than the other E-7 alternative combinations. The remediation of the miscellaneous Parcel E soils would need to be completed prior to constructing the drying ponds for the Parcel F dredged sediment dewatering areas (and before dredging the sediments). This scenario would require that the Parcel E remedy be in place prior to starting the Parcel F remedy or that the remedies be implemented simultaneously, and would delay the beginning of the construction of dewatering facilities and dredging activities under the Parcel F alternative.

2.7.5 Integration of Alternative E-7 and Alternative F-5

This combination of alternatives is fairly compatible. If Alternative E-7 is constructed first the IR-01/21 sheetpile wall takes away some of the space available for the Area X wetland but the wetland could be expanded onto the western portion of IR-01/21. The IR-01/21 cap will be tied into the sheetpile wall that will encompass the shoreline riprap so the Parcel F shoreline source control will not be needed where the sheetpile wall is constructed but will be necessary along the remainder of the Parcel E shoreline.

If Alternative F-5 is implemented first, it would be necessary to coordinate wetland design and construction with the IR-01/21 sheetpile wall to minimize wetland destruction. If Alternative F-5 is implemented first, the Parcel F optional shoreline source control measures, and dredged parts of Areas VIII and IX and created wetland at Area X could become recontaminated by migrating Parcel E contaminants and a portion of Area X would ultimately be backfilled and contained within the IR-01/21 and IR-02 shoreline sheetpile wall.

2.8 ALTERNATIVE E-8: DEED RESTRICTIONS, MULTILAYER CAP AND SHEETPILE WALL AT IR-01/21 AND IR-02 NORTHWEST DEBRIS ZONES, EXCAVATION OF IR-03, MISCELLANEOUS SOILS, AND GROUNDWATER AEC SATURATED SOILS AND DISPOSAL IN OFF-SITE LANDFILLS, SKIMMING AND OFF-SITE RECYCLING OF LNAPL AT IR-03, COLLECTION, PRETREATMENT, AND DISCHARGE OF AEC GROUNDWATER TO POTW, GROUNDWATER MONITORING.

General Overview of Compatibility Issues for Alternative E-8: When implementing Alternative E-8 with any of the Parcel F alternatives (except Alternative F-1), potential issues must be considered that are common to all alternative combinations: (1) the installation of the Parcel E sheetpile wall at IR-01/21 and IR-02 and the existing sheet pile wall at IR-03, (2) the dredging of Parcel F in Areas VIII, IX, and X, (3) the multilayer cap being constructed on IR-01/21 and IR-02 Northwest, (4) the optional shoreline

source control measures, (5) the excavation of saturated soils in the groundwater AECs, the IR-03 soils, and other sites adjacent to the Bay, and (6) the contamination from other offsite sources may recontaminate the sediments and the Bay. Most of these components will be constructed or implemented along the Parcel E shoreline; therefore, the construction of one component affects the others as discussed below.

The IR-01/21 and IR-02 Northwest sheetpile wall is proposed for construction approximately 20 feet offshore. It should be noted that the sheetpile wall is in a much smaller area compared to Alternatives E-2 through E-6. One concern is that if the Parcel E remedy is performed first, appropriate dredging techniques would need to be used so that the sediment dredging would not affect the sheetpile wall. If the sheetpile wall is constructed first, the Parcel F optional shoreline source control measures will not be implemented in that area.

In addition, the construction or the integrity of the multilayer cap on IR-01/21 and IR-02 Northwest could potentially be affected by implementing the optional shoreline source control measures and the sediment dredging to be done adjacent to the cap, depending on which parcel is remediated first. Also, the IR-03 soils, as well as soils adjacent to the Bay will be excavated which may be affected by dredging activities or the shoreline source control measures due to its proximity to the shoreline.

In general, none of these issues would eliminate the selection of an alternative. Each parcel remedy could be implemented separately, however, implementation of the second remedy may affect or destroy portions of the first remedy.

2.8.1 Integration of Alternative E-8 and Alternative F-1

Alternatives E-8 and F-1 are compatible. The shoreline sheetpile wall along IR-01/21 and IR-02 northwest installed as part of Alternative E-8 would contain some of the contaminated Parcel F sediments in Areas VIII, IX, and X, and would prevent some of the Parcel E contaminants from migrating to Parcel F. No schedule or logistical conflicts exist because no action would be taken at Parcel F.

2.8.2 Integration of Alternative E-8 and Alternative F-2

This combination of alternatives is fairly compatible. If Alternative E-8 is constructed first the IR-01/21 sheetpile wall takes away some of the space available for the Area X wetland but the wetland could be

expanded onto the western portion of IR-01/21. The IR-01/21 cap gets tied into the sheetpile wall that will encompass the shoreline riprap so the Parcel F shoreline source control will not be needed where the sheetpile wall is constructed but will be necessary along the remainder of the Parcel E shoreline.

If Alternative F-2 is implemented first, it would be necessary to coordinate wetland design and construction with the IR-01/21 sheetpile wall to minimize wetland destruction.

2.8.3 Integration of Alternative E-8 and Alternative F-3

Alternatives E-8 and F-3 are the most compatible of the possible Alternative E-8 combinations. In addition to the issues common to all Alternative E-8 combinations, if Alternative E-8 is implemented first, the shoreline sheetpile wall would contain some of the contaminated Parcel F sediments in Area X.

If Alternative F-3 is implemented first, the Parcel F optional shoreline source control measures, and dredged parts of Areas VIII, IX, and X could become recontaminated by migrating Parcel E contaminants and Area X would ultimately be backfilled and contained within the IR-01/21 sheetpile wall. In effect, the Parcel F activities would act as interim cleanup actions.

2.8.4 Integration of Alternative E-8 and Alternative F-4

This combination of alternatives would be more difficult to implement than the other E-8 alternative combinations. The remediation of the miscellaneous Parcel E soils would need to be completed prior to constructing the drying ponds for the Parcel F dredged sediment dewatering areas (and before dredging the sediments). This scenario would require that the Parcel E remedy be in place prior to starting the Parcel F remedy or that the remedies be implemented simultaneously, and would delay the beginning of the construction of dewatering facilities and dredging activities under the Parcel F alternative.

2.8.5 Integration of Alternative E-8 and Alternative F-5

This combination of alternatives is fairly compatible. If Alternative E-8 is constructed first the IR-01/21 sheetpile wall takes away some of the space available for the Area X wetland but the wetland could be expanded onto the western portion of IR-01/21. The IR-01/21 cap will be tied into the sheetpile wall that will encompass the shoreline riprap so the Parcel F shoreline source control will not be needed where the sheetpile wall is constructed but will be necessary along the remainder of the Parcel E shoreline.

If Alternative F-5 is implemented first, it would be necessary to coordinate wetland design and construction with the IR-01/21 sheetpile wall to minimize wetland destruction. If Alternative

F-5 is implemented first, the Parcel F optional shoreline source control measures, and dredged parts of Areas VIII and IX and created wetland at Area X could become recontaminated by migrating Parcel E contaminants and a portion of Area X would ultimately be backfilled and contained within the IR-01/21 and IR-02 shoreline sheetpile wall.

3.0 INTEGRATION ANALYSIS BY PARCEL F ALTERNATIVES

In the following subsections, each of the Parcel F remedial alternatives is compared with each of the Parcel E remedial alternatives to identify potential integration issues. Each subsection includes a discussion of integration issues common to all alternative combinations as well as combination-specific issues.

3.1 ALTERNATIVE F-1: NO ACTION

General Overview of Compatibility Issues for Alternative F-1: When implementing Alternative F-1 with any of the Parcel E alternatives, two potential issues must be considered: (1) the optional shoreline source control measures would not be implemented so contaminants could potentially migrate through the riprap into the Bay and potentially recontaminate the Parcel F sediments and the Bay and (2) contamination from other offsite sources could migrate into the Bay and potentially recontaminate the Parcel F sediments.

3.1.1 Integration of Alternative F-1 and Alternative E-1

Alternatives F-1 and E-1 are the no action alternatives for both parcels. Implementation of both of these alternatives would be compatible with the other and not create any logistical or scheduling conflicts. However, contaminant migration from Parcel E to Parcel F would not be prevented.

3.1.2 Integration of Alternative F-1 and Alternative E-2

Alternatives F-1 and E-2 are compatible. The shoreline sheetpile wall, installed as part of Alternative E-2 would contain some of the contaminated Parcel F sediments in Areas VIII, IX, and X, and would prevent Parcel E contaminants from migrating to Parcel F. No schedule or logistical conflicts exist because no action would be taken at Parcel F.

3.1.3 Integration of Alternative F-1 and Alternative E-3

Alternatives F-1 and E-3 are compatible. The shoreline sheetpile wall and interceptor trench, installed as part of Alternative E-3 would contain some of the contaminated Parcel F sediments in Areas VIII, IX, and X, and would prevent Parcel E contaminants from migrating to Parcel F. No schedule or logistical conflicts exist because no action would be taken at Parcel F.

3.1.4 Integration of Alternative F-1 and Alternative E-4

Alternatives F-1 and E-4 are compatible. The shoreline sheetpile wall and interceptor trench, installed as part of Alternative E-4 would contain some of the contaminated Parcel F sediments in Areas VIII, IX, and X, and would prevent Parcel E contaminants from migrating to Parcel F. No schedule or logistical conflicts exist because no action would be taken at Parcel F.

3.1.5 Integration of Alternative F-1 and Alternative E-5

Alternatives F-1 and E-5 are compatible. The shoreline sheetpile wall and interceptor trench, installed as part of Alternative E-5 would contain some of the contaminated Parcel F sediments in Areas VIII, IX, and X, and would prevent Parcel E contaminants from migrating to Parcel F. No schedule or logistical conflicts exist because no action would be taken at Parcel F.

3.1.6 Integration of Alternative F-1 and Alternative E-6

Alternatives F-1 and E-6 are compatible. The shoreline sheetpile wall and interceptor trench, installed as part of Alternative E-6 would contain some of the contaminated Parcel F sediments in Areas VIII, IX, and X, and would prevent Parcel E contaminants from migrating to Parcel F. No schedule or logistical conflicts exist because no action would be taken at Parcel F.

3.1.7 Integration of Alternative F-1 and Alternative E-7

Alternatives F-1 and E-7 are compatible. The shoreline sheetpile wall along IR-01/21 and IR-02 northwest installed as part of Alternative E-7 would contain some of the contaminated Parcel F sediments in Areas VIII, IX, and X, and would prevent some of the Parcel E contaminants from migrating to Parcel F. No schedule or logistical conflicts exist because no action would be taken at Parcel F.

3.1.8 Integration of Alternative F-1 and Alternative E-8

Alternatives F-1 and E-8 are compatible. The shoreline sheetpile wall along IR-01/21 and IR-02 northwest installed as part of Alternative E-8 would contain some of the contaminated Parcel F sediments in Areas VIII, IX, and X, and would prevent some of the Parcel E contaminants from migrating to Parcel F. No schedule or logistical conflicts exist because no action would be taken at Parcel F.

3.2 ALTERNATIVE F-2: DREDGING/CAPPING IN-PLACE/CONFINED DISPOSAL FACILITIES/SOURCE CONTROL MEASURES/MONITORING

General Overview of Compatibility Issues for Alternative F-2: Alternative F-2 consists of removing the sediments from Areas VIII and IX, placing them on Area X, capping in place, then creating an on-site wetlands. When implementing Alternative F-2 with any of the Parcel E alternatives (except Alternative E-1), seven potential issues must be considered that are common to all alternative combinations: (1) the parcel F cap in place and wetland creation area (Area X) south of IR-1/21 and IR-02 Northwest, (2) the Parcel E sheetpile wall (and interceptor trench for some Parcel E alternatives), (3) the onshore multilayer cap at IR-01/21 and IR-02 Northwest, (4) the excavation of contaminated soils adjacent to the Bay (in some alternatives), (5) the dredging of Parcel F sediments in Areas VIII and IX, (6) the optional shoreline source control measures, and (7) the contamination from other offsite sources may recontaminate the sediments, the Bay, and contaminate the newly created on-site wetlands. Most of these components will be constructed or implemented along the Parcel E shoreline; therefore, the construction of one component affects the others as discussed below.

The IR-01/21 and IR-02 Northwest sheetpile wall is proposed for construction approximately 20 feet offshore. One concern is that if the Parcel E remedy is performed first, appropriate dredging techniques would need to be used so that the sediment dredging would not affect the sheetpile wall. If the sheetpile wall is constructed first, the Parcel F optional shoreline source control measures will not be implemented in that area.

In addition, the construction or the integrity of the multilayer cap on IR-01/21 and IR-02 Northwest could potentially be affected by the sediment dredging to be done adjacent to the cap and construction of the Parcel F cap and wetlands, depending on which parcel is remediated first. Also, the IR-03 soils will be excavated which may be affected by dredging activities or the Parcel F optional shoreline source control measures due to IR-03's proximity to the shoreline.

In general, none of these issues would eliminate the selection of an alternative. Each parcel remedy could be implemented separately; however, implementation of the second remedy may affect or destroy portions of the first remedy. Therefore, it would be beneficial if the construction of the onshore and offshore caps, the sheetpile wall/interceptor trench, and the wetlands creation were implemented together to be both cost effective, and minimize damage to and reconstruction of an existing alternative.

3.2.1 Integration of Alternative F-2 and Alternative E-1

This combination of alternatives is compatible. The potential issue to be considered are that for Alternative E-1, no action would be conducted. Contamination from Parcel E and other offsite sources may potentially recontaminate the sediments and the Bay and affect the on-site wetland.

3.2.2 Integration of Alternative F-2 and Alternative E-2

Alternatives F-2 and E-2 are compatible. In addition to the issues common to all Alternative F-2 combinations, if Alternative F-2 is implemented first, the Parcel F optional shoreline source control measures, and dredged parts of Areas VIII and IX and created wetland at Area X could become recontaminated by migrating Parcel E contaminants and would ultimately be backfilled and contained within the Parcel E shoreline sheetpile wall. In effect, the Parcel F activities would act as interim cleanup actions.

If Alternative E-2 is implemented first, the shoreline sheetpile wall would contain some of the contaminated Parcel F sediments in Areas VIII and IX, and limit the area available for creating a wetland in Area X.

3.2.3 Integration of Alternative F-2 and Alternative E-3

The combination of Alternatives F-2 and E-3 is compatible. In addition to the issues common to all Alternative F-2 combinations, if Alternative F-2 is implemented first, the Parcel F optional shoreline source control measures, and dredged parts of Areas VIII and IX and created wetland at Area X could become recontaminated by migrating Parcel E contaminants and would ultimately be backfilled and contained within the Parcel E shoreline sheetpile wall. In effect, the Parcel F activities would act as interim cleanup actions.

If Alternative E-3 is implemented first, the shoreline sheetpile wall and interceptor trench would contain some of the contaminated Parcel F sediments in Areas VIII and IX, and limit the area available for

creating a wetland in Area X. In addition, the optional shoreline source control measures would not be conducted.

3.2.4 Integration of Alternative F-2 and Alternative E-4

The combination of Alternatives F-2 and E-4 are compatible. In addition to the issues common to all Alternative F-2 combinations, if Alternative F-2 is implemented first, the Parcel F optional shoreline source control measures, and dredged parts of Areas VIII and IX and created wetland at Area X could become recontaminated by migrating Parcel E contaminants and would ultimately be backfilled and contained within the Parcel E shoreline sheetpile wall. In effect, the Parcel F activities would act as interim cleanup actions.

If Alternative E-4 is implemented first, the shoreline sheetpile wall and interceptor trench would contain some of the contaminated Parcel F sediments in Areas VIII and IX, and limit the area available for creating a wetland in Area X.

3.2.5 Integration of Alternative F-2 and Alternative E-5

Alternatives F-2 and E-5 are compatible. In addition to the issues common to all Alternative F-2 combinations, this combination will require a longer time duration since the Parcel E contaminated soils will be treated on-site prior to placing them at IR-01/21 and IR-02 Northwest. If Alternative F-2 is implemented first, the Parcel F optional shoreline source control measures, and dredged parts of Areas VIII and IX and created wetland at Area X could become recontaminated by migrating Parcel E contaminants and would ultimately be backfilled and contained within the Parcel E shoreline sheetpile wall. In effect, the Parcel F activities would act as interim cleanup actions.

If Alternative E-5 is implemented first, the shoreline sheetpile wall and interceptor trench would contain some of the contaminated Parcel F sediments in Areas VIII and IX, and limit the area available for creating a wetland in Area X.

3.2.6 Integration of Alternative F-2 and Alternative E-6

The combination of Alternatives F-2 and E-6 are compatible. In addition to the issues common to all Alternative F-2 combinations, if Alternative F-2 is implemented first, the Parcel F optional shoreline source control measures, and dredged parts of Areas VIII and IX and created wetland at Area X could become recontaminated by migrating Parcel E contaminants and would ultimately be backfilled and

contained within the Parcel E shoreline sheetpile wall. In effect, the Parcel F activities would act as interim cleanup actions.

If Alternative E-6 is implemented first, the shoreline sheetpile wall and interceptor trench would contain some of the contaminated Parcel F sediments in Areas VIII and IX, and limit the area available for creating a wetland in Area X.

3.2.7 Integration of Alternative F-2 and Alternative E-7

This combination of alternatives is fairly compatible. This combination would be easier to perform (more compatible) since the shoreline sheetpile wall will only be installed at IR-01/21 and IR-02. In addition to the issues identified in the F-2 alternative combinations, if Alternative F-2 is implemented first, it would be necessary to coordinate wetland design and construction with the IR-01/21 sheetpile wall to minimize wetland destruction.

If Alternative E-7 is constructed first, the IR-01/21 sheetpile wall takes away some of the space available for the Area X wetland but the wetland could be expanded onto the western portion of IR-01/21. The IR-01/21 cap will be tied into the sheetpile wall that will encompass the shoreline riprap so the Parcel F shoreline source control will not be needed where the sheetpile wall is constructed but will be necessary along the remainder of the Parcel E shoreline.

3.2.8 Integration of Alternative F-2 and Alternative E-8

This combination of alternative is compatible. This combination would be easier to perform (more compatible) since the only shoreline sheetpile wall will only be installed at IR-01/21 and IR-02. In addition to the issues identified in the F-2 alternative combinations, if Alternative F-2 is implemented first, it would be necessary to coordinate wetland design and construction with the IR-01/21 sheetpile wall to minimize wetland destruction.

If Alternative E-8 is constructed first the IR-01/21 sheetpile wall takes away some of the space available for the Area X wetland but the wetland could be expanded onto the western portion of IR-01/21. The IR-01/21 cap will be tied into the sheetpile wall that will encompass the shoreline riprap so the Parcel F shoreline source control will not be needed where the sheetpile wall is constructed but will be necessary along the remainder of the Parcel E shoreline.

3.3 ALTERNATIVE F-3: DREDGING/CONFINED DISPOSAL FACILITIES/SOURCE CONTROL MEASURES/MONITORING

General Overview of Compatibility Issues for Alternative F-3: Under the F-3 alternative, all the sediment from Areas VIII, IX, and X would be removed and placed in the CDFs at the dry docks. When implementing Alternative F-3 with any of the Parcel E alternatives (except Alternative E-1), five compatibility issues must be considered: (1) the dredging of Parcel F sediments in Areas VIII, IX, and X, (2) the optional shoreline source control measures, (3) the Parcel E sheetpile wall (and interceptor trench for some Parcel E alternatives), (4) the excavation of contaminated soils adjacent to the Bay (in some alternatives), and (5) the contamination from other offsite sources may recontaminate the sediments and the Bay. Most of these components will be constructed or implemented along the Parcel E shoreline; therefore, the construction of one component affects the others as discussed below.

The IR-01/21 and IR-02 Northwest sheetpile wall is proposed for construction approximately 20 feet offshore. One concern is that if the Parcel E remedy is performed first, appropriate dredging techniques would need to be used so that the sediment dredging would not affect the sheetpile wall. If the sheetpile wall is constructed first, the Parcel F optional shoreline source control measures will not be implemented in those areas.

The IR-03 soils and soils adjacent to the Bay will be excavated which may be affected by dredging activities or the Parcel F optional shoreline source control measures due to its proximity to the shoreline.

In general, none of these issues would eliminate the selection of an alternative. And of all the Parcel F alternatives, Alternative F-3 is the easiest to implement with the Parcel E alternatives. Each parcel remedy could be implemented separately, however, the second remedy implemented may affect or destroy portions of the first remedy.

3.3.1 Integration of Alternative F-3 and Alternative E-1

This combination of alternatives is fairly compatible. The potential issues to be considered are that for Alternative E-1, no action would be conducted. Therefore, contamination from Parcel E and other offsite sources may potentially recontaminate the sediments and the Bay. No additional integration issues exist beyond those describe as common to all Alternative F-3 combinations.

3.3.2 Integration of Alternative F-3 and Alternative E-2

This combination would be the most compatible of the Alternative F-3 and Parcel E alternatives (and the easiest to implement), because the Parcel F sediments would be removed, all of Parcel E would be capped and no soil adjacent to the bay would be excavated, and a sheetpile wall and interceptor trench would be installed onshore. See the issues identified under the general overview.

If Alternative F-3 is implemented first, the Parcel F optional shoreline source control measures, and dredged parts of Areas VIII, IX, and X could become recontaminated by migrating Parcel E contaminants and would ultimately be backfilled and contained within the Parcel E shoreline sheetpile wall. In effect, the Parcel F activities would act as interim cleanup actions.

If Alternative E-2 is implemented first, the shoreline sheetpile wall would contain some of the contaminated Parcel F sediments in Areas VIII, IX, and X.

3.3.3 Integration of Alternative F-3 and Alternative E-3

The combination of Alternatives F-3 and E-3 is compatible. In addition to the issues common to all Alternative F-3 combinations, if Alternative F-3 is implemented first, the Parcel F optional shoreline source control measures, and dredged parts of Areas VIII, IX, and X could become recontaminated by migrating Parcel E contaminants and would ultimately be backfilled and contained within the Parcel E shoreline sheetpile wall. In effect, the Parcel F activities would act as interim cleanup actions.

If Alternative E-3 is implemented first, the shoreline sheetpile wall would contain some of the contaminated Parcel F sediments in Areas VIII, IX, and X.

3.3.4 Integration of Alternative F-3 and Alternative E-4

The combination of Alternatives F-3 and E-4 is compatible. In addition to the issues common to all Alternative F-3 combinations, if Alternative F-3 is implemented first, the Parcel F optional shoreline source control measures, and dredged parts of Areas VIII, IX, and X could become recontaminated by migrating Parcel E contaminants and would ultimately be backfilled and contained within the Parcel E shoreline sheetpile wall. In effect, the Parcel F activities would act as interim cleanup actions.

If Alternative E-4 is implemented first, the shoreline sheetpile wall would contain some of the contaminated Parcel F sediments in Areas VIII, IX, and X.

3.3.5 Integration of Alternative F-3 and Alternative E-5

The combination of Alternatives F-3 and E-5 is compatible. However, this combination will require a longer time duration since the miscellaneous Parcel E contaminated soils will be treated on-site prior to placing them at IR-01/21 and IR-02. In addition to the issues common to all Alternative F-3 combinations, if Alternative F-3 is implemented first, the Parcel F optional shoreline source control measures, and dredged parts of Areas VIII, IX, and X could become recontaminated by migrating Parcel E contaminants and would ultimately be backfilled and contained within the Parcel E shoreline sheetpile wall. In effect, the Parcel F activities would act as interim cleanup actions.

If Alternative E-5 is implemented first, the shoreline sheetpile wall would contain some of the contaminated Parcel F sediments in Areas VIII, IX, and X.

3.3.6 Integration of Alternative F-3 and Alternative E-6

This combination of alternatives is compatible. In addition to the issues common to all Alternative F-3 combinations, if Alternative F-3 is implemented first, the Parcel F optional shoreline source control measures, and dredged parts of Areas VIII, IX, and X could become recontaminated by migrating Parcel E contaminants and would ultimately be backfilled and contained within the Parcel E shoreline sheetpile wall. In effect, the Parcel F activities would act as interim cleanup actions.

If Alternative E-6 is implemented first, the shoreline sheetpile wall would contain some of the contaminated Parcel F sediments in Areas VIII, IX, and X.

3.3.7 Integration of Alternative F-3 and Alternative E-7

This combination of alternatives is compatible. In addition to the issues common to all Alternative F-3 combinations, if Alternative F-3 is implemented first, the Parcel F optional shoreline source control measures, and dredged parts of Areas VIII, IX, and X could become recontaminated by migrating Parcel E contaminants and would ultimately be backfilled and contained within the Parcel E shoreline sheetpile wall. In effect, the Parcel F activities would act as interim cleanup actions.

If Alternative E-7 is implemented first, the shoreline sheetpile wall would contain some of the contaminated Parcel F sediments in Area X.

3.3.8 Integration of Alternative F-3 and Alternative E-8

This combination of alternatives is compatible. In addition to the issues common to all Alternative F-3 combinations, if Alternative F-3 is implemented first, the Parcel F optional shoreline source control measures, and dredged parts of Areas VIII, IX, and X could become recontaminated by migrating Parcel E contaminants and would ultimately be backfilled and contained within the Parcel E shoreline sheetpile wall. In effect, the Parcel F activities would act as interim cleanup actions.

If Alternative E-8 is implemented first, the shoreline sheetpile wall would contain some of the contaminated Parcel F sediments in Areas X.

3.4 ALTERNATIVE F-4: DREDGING/DEWATERING/STABILIZATION/OFF-SITE LANDFILL DISPOSAL/SOURCE CONTROL MEASURES

General Overview of Compatibility Issues for Alternative F-4: Under the F-4 alternative, all the sediment removed from Areas VIII, IX, and X would be removed and transported to the rehandling facilities on Parcels D and E for dewatering and stabilization prior to off-site disposal.

When implementing Alternative F-4 with any of the Parcel E alternatives (except Alternative E-1), six compatibility issues must be considered: (1) completion of Parcel E soil remedy prior to starting the Parcel F remedy, (2) the dredging of Parcel F sediments in Areas VIII, IX, and X, (3) the optional shoreline source control measures, (4) the Parcel E sheetpile wall (and interceptor trench for some Parcel E alternatives), (5) the excavation of contaminated soils adjacent to the Bay (in some alternatives), and (6) the contamination from other offsite sources may recontaminate the sediments and the Bay. Most of these components will be constructed or implemented along the Parcel E shoreline; therefore, the construction of one component affects the others as discussed below.

The remediation of the miscellaneous Parcel E soils need to be completed prior to constructing the drying ponds for the Parcel F dredged sediment dewatering areas (and before dredging the sediments). This would require that the Parcel E remedy be in place prior to starting the Parcel F remedy or else the remedies be conducted simultaneously.

The IR-01/21 and IR-02 Northwest sheetpile wall is proposed for construction approximately 20 feet offshore. One concern is that if the Parcel E remedy is performed first, appropriate dredging techniques would need to be used so that the sediment dredging would not affect the sheetpile wall. If the sheetpile wall is constructed first, the Parcel F optional shoreline source control measures will not be implemented

in those areas. The IR-03 soils and soils adjacent to the Bay may be excavated (depending on the alternative) which may be affected by dredging activities or the Parcel F optional shoreline source control measures due to its proximity to the shoreline.

In general, none of these issues would eliminate the selection of an alternative. The combination of Alternative F-4 and any of the Parcel E alternatives would be more difficult to implement than the other Parcel F alternative combinations, due to the onshore activities of Alternative F-4.

Since an assumption of Alternative F-4 is that the Parcel E remedy is in place prior to implementing Alternative F-4, the following evaluation with the Parcel E remedial alternatives only evaluates the implementing the alternatives in the same order.

3.4.1 Integration of Alternative F-4 and Alternative E-1

This combination of alternatives is not very compatible and would be difficult to implement. Under the F-4 alternative, the optional shoreline source control measures will be performed and the dredged sediment would be removed and transported to the rehandling facilities on Parcels D and E for dewatering and stabilization prior to off-site disposal. Alternative F-4 assumes that the Parcel E areas will be remediated prior to being used as rehandling facilities for dewatering the dredged sediments in drying ponds. However, with this combination of alternatives, there would be no action conducted for Parcel E, so the soil will not be remediated. Therefore, appropriate precautions will need to be taken when constructing the drying ponds in the contaminated areas. Also, contamination from Parcel E and other offsite sources may potentially recontaminate the sediments and the Bay.

3.4.2 Integration of Alternative F-4 and Alternative E-2

This combination of alternatives would be very difficult to implement due to the presence of the single-layer cap on Parcel E in the proposed areas of the Parcel F rehandling facility drying ponds. Alternative F-4 assumes that the Parcel E areas will be remediated prior to being used as rehandling facilities for dewatering the dredged sediments in drying ponds. However with this combination of alternatives, the soil remaining in Parcel E will be covered with a single-layer cap which is not conducive to constructing the drying ponds in the these areas. Therefore, this combination of alternatives would not be compatible.

3.4.3 Integration of Alternative F-4 and Alternative E-3

The combination of Alternatives F-4 and E-3 would be difficult to implement for the reasons identified under the general overview.

3.4.4 Integration of Alternative F-4 and Alternative E-4

The combination of Alternatives F-4 and E-4 would be difficult to implement for the reasons identified under the general overview.

3.4.5 Integration of Alternative F-4 and Alternative E-5

The combination of Alternatives F-4 and E-5 would be difficult to implement. In addition to the reasons identified under the general overview, Alternative E-5 includes on-site treatment by thermal desorption and solidification/stabilization of the miscellaneous Parcel E soils and then placement of the treated soil at the IR-01/21 and IR-02 Northwest debris zones. In addition, since the soils would be treated on site, the timeframe for the overall remediation of Parcels E and F would be extended.

3.4.6 Integration of Alternative F-4 and Alternative E-6

The combination of Alternatives F-4 and E-6 would be difficult to implement for the reasons identified under the general overview.

3.4.7 Integration of Alternative F-4 and Alternative E-7

The combination of Alternatives F-4 and E-7 would be difficult to implement for the reasons identified under the general overview. The remediation of miscellaneous Parcel E soils and removal of the groundwater AECs would need to have been completed prior to constructing the drying ponds for the Parcel F dredged sediment dewatering areas (and before dredging the sediments). This would require that the Parcel E remedy be in place prior to starting the Parcel F remedy or else the remedies be conducted simultaneously.

3.4.8 Integration of Alternative F-4 and Alternative E-8

The combination of Alternatives F-4 and E-8 would be difficult to implement for the reasons identified under the general overview. The remediation of miscellaneous Parcel E soils and removal of the

groundwater AECs would need to have been completed prior to constructing the drying ponds for the Parcel F dredged sediment dewatering areas (and before dredging the sediments). This would require that the Parcel E remedy be in place prior to starting the Parcel F remedy or else the remedies be conducted simultaneously.

3.5 ALTERNATIVE F-5: DREDGING/CAPPING IN-PLACE/OFF-SITE WETLAND CREATION/CDF CONSTRUCTION/SOURCE CONTROL MEASURES/MONITORING

General Overview of Compatibility Issues for Alternative F-5: Alternative F-5 consists of removing the sediments from Areas VIII and IX, cap in-place the sediments at Area X and creating an on-site wetlands. When implementing Alternative F-5 with any of the Parcel E alternatives (except Alternative E-1), seven potential issues must be considered that are common to all alternative combinations: (1) the parcel F cap in-place and wetland creation area (Area X) south of IR-1/21 and IR-02 Northwest, (2) the Parcel E sheetpile wall (and interceptor trench for some Parcel E alternatives), (3) the onshore multilayer cap at IR-01/21 and IR-02 Northwest, (4) the excavation of contaminated soils adjacent to the Bay (in some alternatives), (5) the dredging of Parcel F sediments in Areas VIII and IX, (6) the optional shoreline source control measures, and (7) the contamination from other offsite sources may recontaminate the sediments, the Bay, and the newly created on-site wetlands. Most of these components will be constructed or implemented along the Parcel E shoreline; therefore, the construction of one component affects the others as discussed below.

The IR-01/21 and IR-02 Northwest sheetpile wall is proposed for construction approximately 20 feet offshore. One concern is that if the Parcel E remedy is performed first, appropriate dredging techniques would need to be used so that the sediment dredging would not affect the sheetpile wall. If the sheetpile wall is constructed first, the Parcel F optional shoreline source control measures will not be implemented in that area.

In addition, the construction or the integrity of the multilayer cap on IR-01/21 and IR-02 Northwest could potentially be affected by implementing the sediment dredging to be done adjacent to the cap and construction of the Parcel F cap and wetlands, depending on which Parcel is remediated first. Also, the contaminated soils adjacent to the Bay will be excavated which may be affected by dredging activities or the Parcel F optional shoreline source control measures due to its proximity to the shoreline.

Lastly an off-site location for wetlands creation would need to be identified for the sediments.

In general, none of these issues would eliminate the selection of an alternative. Each parcel remedy could be implemented separately, however, implementation of the second remedy may affect or destroy portions of the first remedy.

It would be beneficial if the construction of the onshore and offshore caps, the sheetpile wall/interceptor trench, and the wetlands creation were done together to be both cost effective, and minimize damage to and the reconstruction of an existing alternative.

3.5.1 Integration of Alternative F-5 and Alternative E-1

This combination of alternatives is compatible. The potential issues to be considered are that for Alternative E-1, no action would be conducted. Therefore, contamination from Parcel E and other offsite sources may potentially recontaminate the sediments and the Bay and affect the on-site wetland.

3.5.2 Integration of Alternative F-5 and Alternative E-2

Alternatives F-5 and E-2 are compatible. In addition to the issues common to all Alternative F-5 combinations, if Alternative F-5 is implemented first, the Parcel F optional shoreline source control measures, and dredged parts of Areas VIII and IX and created wetland at Area X could become recontaminated by migrating Parcel E contaminants and would ultimately be backfilled and contained within the Parcel E shoreline sheetpile wall. In effect, the Parcel F activities would act as interim cleanup actions.

If Alternative E-2 is implemented first, the shoreline sheetpile wall would contain some of the contaminated Parcel F sediments in Areas VIII and IX, and limit the area available for creating a wetland in Area X. Also, another concern would be that all of Parcel E would be capped with either a multilayer or singlelayer cap, depending on the area. Therefore, the dredging would need to be coordinated so as not to minimize damage to the cap and the sheetpile wall.

3.5.3 Integration of Alternative F-5 and Alternative E-3

The combination of Alternatives F-5 and E-3 is compatible. In addition to the issues common to all Alternative F-5 combinations, if Alternative F-5 is implemented first, the Parcel F optional shoreline source control measures, and dredged parts of Areas VIII and IX and created wetland at Area X could become recontaminated by migrating Parcel E contaminants and would ultimately be backfilled and

contained within the Parcel E shoreline sheetpile wall. In effect, the Parcel F activities would act as interim cleanup actions.

If Alternative E-3 is implemented first, the shoreline sheetpile wall and interceptor trench would contain some of the contaminated Parcel F sediments in Areas VIII and IX, and limit the area available for creating a wetland in Area X. In addition, the optional shoreline source control measures would not be conducted.

3.5.4 Integration of Alternative F-5 and Alternative E-4

The combination of Alternatives F-5 and E-4 are compatible. In addition to the issues common to all Alternative F-5 combinations, if Alternative F-5 is implemented first, the Parcel F optional shoreline source control measures, and dredged parts of Areas VIII and IX and created wetland at Area X could become recontaminated by migrating Parcel E contaminants and would ultimately be backfilled and contained within the Parcel E shoreline sheetpile wall. In effect, the Parcel F activities would act as interim cleanup actions.

If Alternative E-4 is implemented first, the shoreline sheetpile wall and interceptor trench would contain some of the contaminated Parcel F sediments in Areas VIII and IX, and limit the area available for creating a wetland in Area X.

3.5.5 Integration of Alternative F-5 and Alternative E-5

Alternatives F-5 and E-5 are compatible. In addition to the issues common to all Alternative F-5 combinations, this combination will require a longer time duration since the Parcel E contaminated soils will be treated on site prior to placing them at IR-01/21 and IR-02 Northwest. If Alternative F-5 is implemented first, the Parcel F optional shoreline source control measures, and dredged parts of Areas VIII and IX and created wetland at Area X could become recontaminated by migrating Parcel E contaminants and would ultimately be backfilled and contained within the Parcel E shoreline sheetpile wall. In effect, the Parcel F activities would act as interim cleanup actions.

If Alternative E-5 is implemented first, the shoreline sheetpile wall and interceptor trench would contain some of the contaminated Parcel F sediments in Areas VIII and IX, and limit the area available for creating a wetland in Area X.

3.5.6 Integration of Alternative F-5 and Alternative E-6

The combination of Alternatives F-5 and E-6 are compatible. In addition to the issues common to all Alternative F-5 combinations, if Alternative F-5 is implemented first, the Parcel F optional shoreline source control measures, and dredged parts of Areas VIII and IX and created wetland at Area X could become recontaminated by migrating Parcel E contaminants and would ultimately be backfilled and contained within the Parcel E shoreline sheetpile wall. In effect, the Parcel F activities would act as interim cleanup actions.

If Alternative E-6 is implemented first, the shoreline sheetpile wall and interceptor trench would contain some of the contaminated Parcel F sediments in Areas VIII and IX, and limit the area available for creating a wetland in Area X.

3.5.7 Integration of Alternative F-5 and Alternative E-7

This combination of alternatives is compatible. This combination would be easier to perform (more compatible) since the shoreline sheetpile wall will only be installed at IR-01/21 and IR-02 Northwest. In addition to the issues identified in the F-5 alternative combinations, if Alternative F-5 is implemented first, it would be necessary to coordinate wetland design and construction with the IR-01/21 sheetpile wall to minimize wetland destruction.

If Alternative E-7 is constructed first, the IR-01/21 sheetpile wall takes away some of the space available for the Area X wetland but the wetland could be expanded onto the western portion of IR-1/21. The IR-01/21 cap will be tied into the sheetpile wall that will encompass the shoreline riprap so the Parcel F shoreline source control will not be needed where the sheetpile wall is constructed but will be necessary along the remainder of the Parcel E shoreline.

3.5.8 Integration of Alternative F-5 and Alternative E-8

This combination of alternatives is compatible. This combination would be easier to perform since the only shoreline sheetpile wall will only be installed at IR-01/21 and IR-02 Northwest. In addition to the issues identified in the F-5 alternative combinations, if Alternative F-5 is implemented first, it would be necessary to coordinate wetland design and construction with the IR-01/21 sheetpile wall to minimize wetland destruction.

If Alternative E-8 is constructed first, the IR-01/21 sheetpile wall takes away some of the space available for the Area X wetland but the wetland could be expanded onto the western portion of IR-01/21. The IR-01/21 cap will be tied into the sheetpile wall that will encompass the shoreline riprap so the Parcel F shoreline source control will not be needed where the sheetpile wall is constructed but will be necessary along the remainder of the Parcel E shoreline.

4.0 REGULATORY CONCERNS AND OTHER ISSUES

The above evaluation did not consider regulatory agency concerns or nontechnical issues. Some of the regulatory agency concerns include: (1) the Bay Conservation and Development Commission's (BCDC) concern regarding the consistency with the McAteer-Petris Act and BCDC wetland creation policies, (2) California Department of Toxic Substances Control (DTSC) and the Regional Water Quality Control Board's (RWQCB) concern about the interaction of the Parcel E and F alternatives, (3) the Department of Fish and Game (DFG) concern about the ecological impacts on the existing habitat in the areas of the proposed wetlands, (4) San Francisco Redevelopment Agency's (SFRA) concern about reuse issues, and (5) the interests of community groups.

The BCDC has expressed its concern regarding filling in the Bay and most likely would not support Parcel E alternatives that include the offshore sheetpile wall and subsequent filling in the area between the shoreline of Parcel E and the wall. BCDC has not reviewed the Parcel E FS report, and it is unknown which alternative BCDC would support. However, it is likely that BCDC would only support Alternatives E-7 or E-8 because those alternatives do not involve filling in the Bay. BCDC appears to support Alternative F-4 because it is consistent with the protection of San Francisco Bay resources. Alternative F-4 is the only alternative in which the contaminated sediments are completely removed from the Bay and disposed of at an upland area. The other Parcel F alternatives incorporate either filling in Dry Docks 2, 3, 5, 6, and 7, or creating on-site or off-site wetlands with the removed sediments. While BCDC has stated that the on-site fill components would not be consistent with the McAteer-Petris Act and the policies of the Bay Plan, the off-site wetland creation/restoration at a site diked from the Bay or outside of BCDC's Bay jurisdiction, then it would likely be found to be consistent with BCDC's policies. It also appears that placement of dredged material in Dry Docks 5, 6, and 7 may be found consistent with the coastal management program if the fill is needed for marine terminal facilities, and the Navy can ensure that the contaminated sediments will be permanently contained so that there are no short- or long-term impacts to the Bay.

The California DTSC and the RWQCB expressed concern regarding the interaction of existing or new sheetpile walls along the Parcel E shoreline and dredging or wetlands creation, as well as the effects of the wetland creation on groundwater flow.

The California DFG expressed concern regarding the ecological impacts on the existing habitat of the creation of on-site wetlands or off-site wetlands. However, it should be noted that the Navy has agreed to conduct an evaluation of the feasibility of wetland creation at HPS. The inclusion of wetland creation in a final remedial alternative would be discussed in the proposed plan and decided in the record of decision. DFG did not appear to support either Alternative F-2 or F-5 due to the potential damage to existing habitat and interim and permanent lost use. DFG finds all the Parcel F remedies to be unacceptable except Alternative F-4, where all of the contaminated sediments would be removed and sent off site. In addition, if Alternative F-1 were to be selected, DFG would pursue Natural Resource Damage Assessments for both past and future lost use from the site, as well as ongoing harm to fish and wildlife resources.

The San Francisco Redevelopment Agency commented that all of the Parcel F alternatives would be incompatible with its reuse plan since the alternatives either interfere with maritime reuse of Parcel F or with the future reuse of Parcels D and E (due to components of Alternative F-4).

The community groups (MicroSearch and ARC Ecology) also expressed their concerns. MicroSearch believes that the community will accept any alternative that minimizes their exposure to contaminated sediments through off-site transportation, minimizes or consolidates the sediments significantly, and augments the beauty and usability of the HPS area. MicroSearch's comments indicate that it is unable to endorse any of the alternatives. ARC Ecology expressed its concern regarding the integrity of the CDFs and that they be properly designed to eliminate potential discharges. ARC Ecology also suggested adding an alternative for wetlands creation at Parcel E or sediment disposal at the IR-01/21 landfill. ARC Ecology does not support or oppose any alternative.

5.0 RECOMMENDATIONS AND CONCLUSIONS

In summary, the FSs for Parcels E and F were prepared separately and the remedial alternatives were created independently. The selection of an alternative for one parcel may limit the future selection or implementation of an alternative for the other parcel. The majority of the issues identified in this memo could be managed if the alternatives either are combined, designed and implemented together, or are implemented in phases to avoid destroying or damaging the previous parcel remediation.

Three methods could be used to minimize potential incompatibility issues and ensure that the construction or implementation of one alternative does not hinder implementation of another alternative.

The first method would be to combine the two parcels and develop combined remedial alternatives to ensure that the remedial design and implementation of the alternatives are conducted together with the overall objective being cleanup in the most cost effective manner.

The second method would be to keep the parcels separate, but select the remedy for each parcel at the same time, and prepare the remedial design documents and conduct the remedial action for the two parcels either simultaneously or at least in a coordinated manner to minimize unnecessary costs and avoid damage.

The third method would be to keep the parcels separate and phase their overall schedules so that the remedy is selected for the first parcel and then remedial alternatives are created for the second parcel that are compatible with the selected remedy of the first parcel. Thus, all remedial design documents and the remedial actions for both parcels would be consistent with each other.

REFERENCES

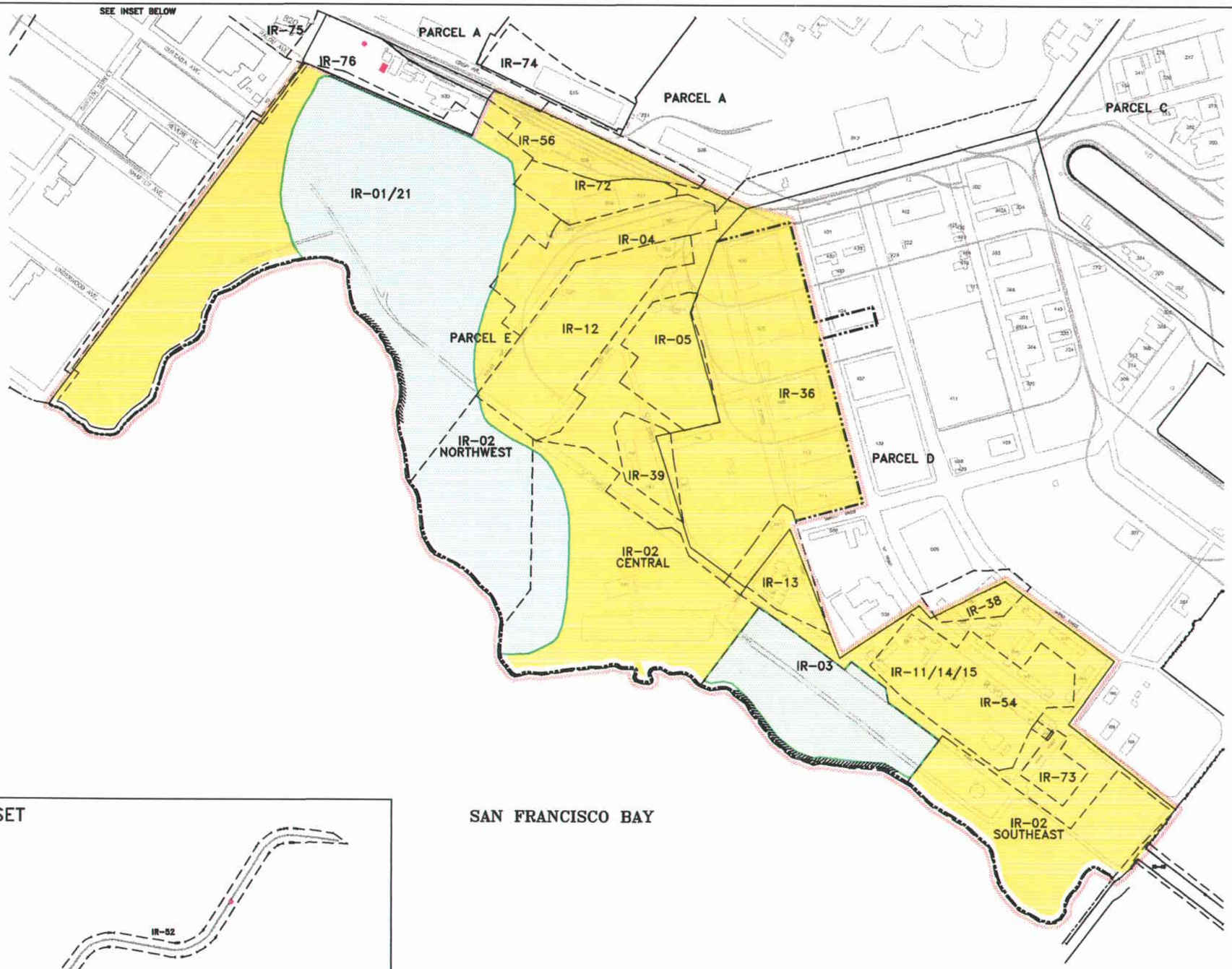
Tetra Tech EM Inc. (TtEMI). 1998. "Draft Parcel E Feasibility Study, Hunters Point Shipyard (HPS), San Francisco, CA." January 15.

TtEMI and Levine-Fricke-Recon. 1998. "Draft Parcel F Feasibility Study, HPS, San Francisco, CA." April.

ATTACHMENT A

PARCEL E REMEDIAL ALTERNATIVE FIGURES FROM THE DRAFT PARCEL E FEASIBILITY STUDY FOR HPS

Figure



EXPLANATION

- 600 — BUILDING OR STRUCTURE
- 518 — DEMOLISHED BUILDING OR STRUCTURE
- EXTENDED INSTALLATION RESTORATION SITE BOUNDARY
- PARCEL BOUNDARY
- EXISTING SHEETPILE WALL
- SHEETPILE OR SLURRY WALL
- MULTILAYER CAP
- SINGLE-LAYER CAP
- AREA CONTAINING SOIL TO BE EXCAVATED AND DISPOSED OF AT OFF-SITE LANDFILL

NOTES

ALTERNATIVE 2 INCLUDES THE FOLLOWING:

1. DEED RESTRICTIONS
2. MULTILAYER CAP AT IR-01/21 AND IR-02 NORTHWEST AND IR-03
3. EXCAVATION OF IR-52 AND IR-76 MISCELLANEOUS SOILS AREAS AND DISPOSAL IN OFF-SITE LANDFILL
4. SINGLE-LAYER CAP OVER OTHER AREAS AT PARCEL E
5. SHEETPILE OR SLURRY WALL AROUND PARCEL E

DEPARTMENT OF THE NAVY — NAVAL FACILITIES ENGINEERING COMMAND

ENGINEERING FIELD ACTIVITY WEST

SAN BRUNO, CALIFORNIA

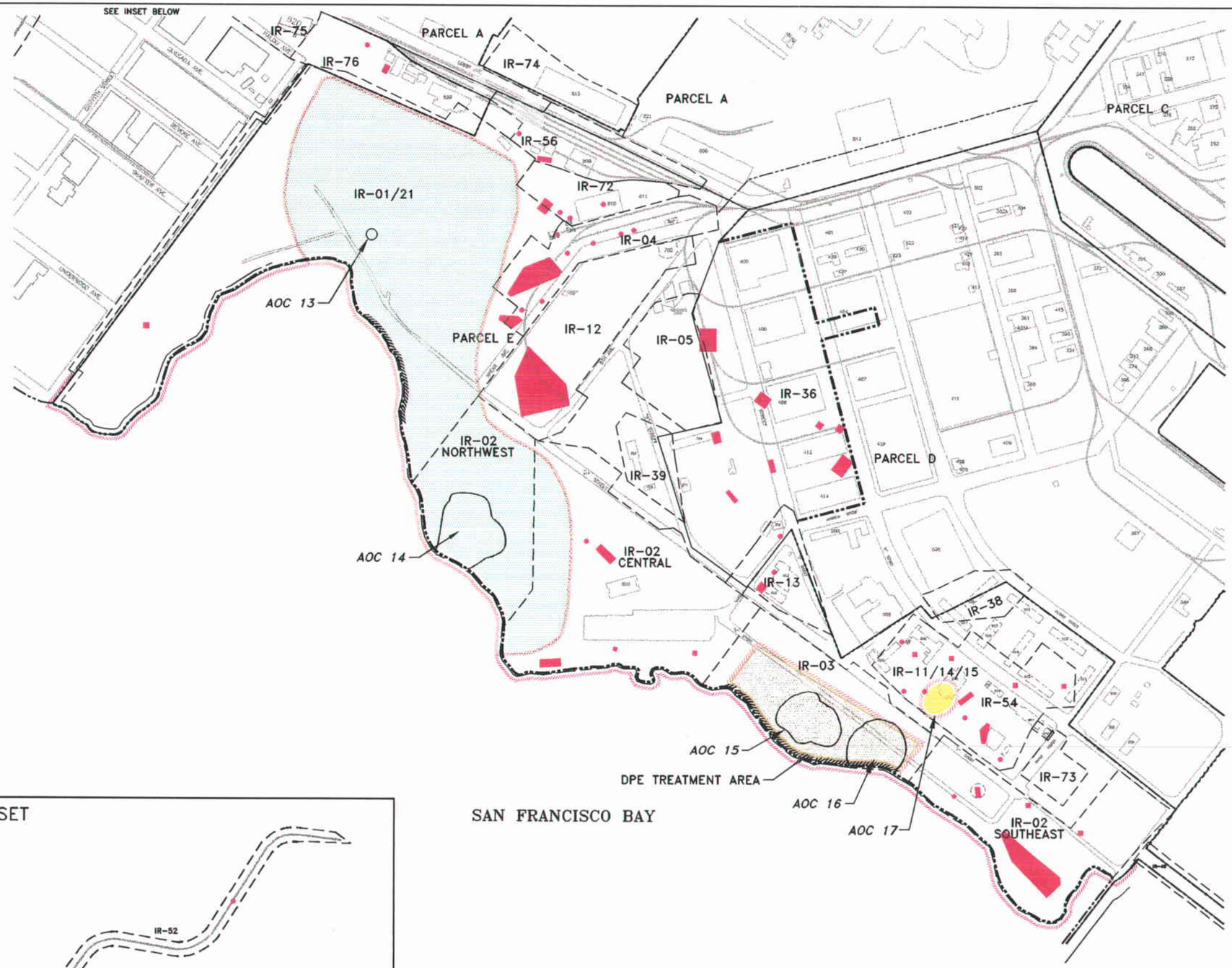
HUNTERS POINT SHIPYARD — SAN FRANCISCO, CALIFORNIA

FIGURE 5-1

SCHEMATIC DIAGRAM OF ALTERNATIVE 2

PARCEL E FEASIBILITY STUDY

PAREALTS.DWG - 12/23/97 - RAO - 069-005B0602



EXPLANATION

- 600 — BUILDING OR STRUCTURE
- 518 — DEMOLISHED BUILDING OR STRUCTURE
- EXTENDED INSTALLATION RESTORATION SITE BOUNDARY
- PARCEL BOUNDARY
- EXISTING SHEETPILE WALL
- SHEETPILE OR SLURRY WALL
- SHEETPILE WALL AND INTERCEPTOR TRENCH
- MULTILAYER CAP
- MULTILAYER CAP/CAMU
- SINGLE-LAYER CAP
- AREA CONTAINING SOIL TO BE EXCAVATED AND PLACED AT IR-01/21 AND IR-02 NORTHWEST DEBRIS ZONES

ABBREVIATIONS

AOC = AREA OF CONCERN
CAMU = CORRECTIVE ACTION MANAGEMENT UNIT
DPE = DUAL PHASE EXTRACTION

NOTES

ALTERNATIVE 3 INCLUDES THE FOLLOWING:

1. DEED RESTRICTIONS
2. MULTILAYER CAP AT IR-01/21 AND IR-02 NORTHWEST
3. SOIL CONSOLIDATION, MULTILAYER CAP, AND DPE TREATMENT AT IR-03
4. EXCAVATION OF MISCELLANEOUS SOILS AND PLACEMENT AT IR-01/21 AND IR-02 NORTHWEST
5. SHEETPILE WALL AND INTERCEPTOR TRENCH ALONG THE SHORELINE
6. ENCAPSULATION OF GROUNDWATER AOCs
7. DISCHARGE OF GROUNDWATER COLLECTED IN TRENCH TO BAY OR CONSTRUCTED WETLAND
8. GROUNDWATER MONITORING

DEPARTMENT OF THE NAVY — NAVAL FACILITIES ENGINEERING COMMAND
ENGINEERING FIELD ACTIVITY WEST
SAN BRUNO, CALIFORNIA
HUNTERS POINT SHIPYARD — SAN FRANCISCO, CALIFORNIA

FIGURE 5-2

SCHEMATIC DIAGRAM OF ALTERNATIVE 3

PARCEL E FEASIBILITY STUDY

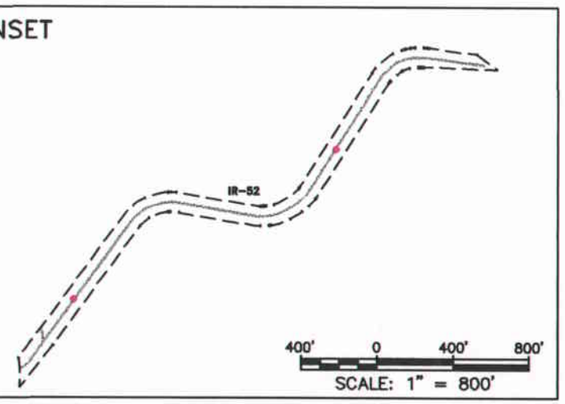
PAREALTS.DWG - 12/23/97 - RAO - 069-005B0602

SEE INSET BELOW

IR-75
IR-76
PARCEL A
IR-74
PARCEL A
PARCEL C
IR-56
IR-72
IR-01/21
IR-04
AOC 13
PARCEL E
IR-12
IR-05
IR-36
IR-02 NORTHWEST
PARCEL D
IR-39
AOC 14
IR-02 CENTRAL
IR-13
IR-38
IR-03
IR-11/14/15
IR-54
AOC 15
LNAPL SKIMMING AREA
IR-73
AOC 16
AOC 17
IR-02 SOUTHEAST
SAN FRANCISCO BAY

250' 0 250' 500'
SCALE: 1" = 500'

INSET



400' 0 400' 800'
SCALE: 1" = 800'

EXPLANATION

- 600 — BUILDING OR STRUCTURE
- 518 — DEMOLISHED BUILDING OR STRUCTURE
- EXTENDED INSTALLATION RESTORATION SITE BOUNDARY
- EXISTING SHEETPILE WALL
- SHEETPILE WALL
- SHEETPILE WALL AND INTERCEPTOR TRENCH
- PARCEL BOUNDARY
- GROUNDWATER AOC TO BE ENCAPSULATED
- MULTILAYER CAP/CAMU
- AREA CONTAINING SOIL TO BE EXCAVATED AND PLACED AT IR-01/21 AND IR-02 NORTHWEST
- AREA CONTAINING SOIL TO BE EXCAVATED AND DISPOSED OF AT OFF-SITE LANDFILL

ABBREVIATIONS

AOC = AREA OF CONCERN
CAMU = CORRECTIVE ACTION MANAGEMENT UNIT
LNAPL = LIGHT NONAQUEOUS-PHASE LIQUID

NOTES

ALTERNATIVE 4 INCLUDES THE FOLLOWING:

1. DEED RESTRICTIONS
2. MULTILAYER CAP AT IR-01/21 AND IR-02 NORTHWEST
3. EXCAVATION AND OFF-SITE DISPOSAL OF VISIBLY CONTAMINATED IR-03 SOIL
4. SKIMMING AND OFF-SITE RECYCLING OF LNAPL AT IR-03
5. EXCAVATION OF OTHER IR-03 SOIL AND MISCELLANEOUS SOILS AND PLACEMENT AT IR-01/21 AND IR-02 NORTHWEST
6. SHEETPILE WALL AND INTERCEPTOR TRENCH ALONG SHORELINE
7. ENCAPSULATION OF GROUNDWATER AOCs
8. DISCHARGE OF GROUNDWATER COLLECTED IN TRENCH TO BAY OR CONSTRUCTED WETLAND
9. GROUNDWATER MONITORING

DEPARTMENT OF THE NAVY — NAVAL FACILITIES ENGINEERING COMMAND
ENGINEERING FIELD ACTIVITY WEST
SAN BRUNO, CALIFORNIA
HUNTERS POINT SHIPYARD — SAN FRANCISCO, CALIFORNIA

FIGURE 5-3

SCHEMATIC DIAGRAM OF ALTERNATIVE 4

PARCEL E FEASIBILITY STUDY

PAREALTS.DWG - 12/23/97 - RAO - 069-00580602

SEE INSET BELOW

IR-75
IR-76
PARCEL A
IR-74
PARCEL A
PARCEL C
IR-56
IR-72
IR-01/21
IR-04
AOC 13
PARCEL E
IR-12
IR-05
IR-36
IR-02 NORTHWEST
PARCEL D
IR-39
AOC 14
IR-02 CENTRAL
IR-13
IR-38
IR-03
IR-11/14/15
IR-54
AOC 15
IR-73
LNAPL SKIMMING AREA
AOC 16
AOC 17
IR-02 SOUTHEAST
SAN FRANCISCO BAY

250' 0 250' 500'
SCALE: 1" = 500'

EXPLANATION

- 600 — BUILDING OR STRUCTURE
- 518 — DEMOLISHED BUILDING OR STRUCTURE
- EXTENDED INSTALLATION RESTORATION SITE BOUNDARY
- PARCEL BOUNDARY
- EXISTING SHEETPILE WALL
- SHEETPILE WALL AND INTERCEPTOR TRENCH
- MULTILAYER CAP
- AREA CONTAINING SOIL TO BE EXCAVATED, TREATED, AND PLACED AT IR-01/21 AND IR-02 NORTHWEST

ABBREVIATIONS

POTW = PUBLICLY-OWNED TREATMENT WORKS
LNAPL = LIGHT NONAQUEOUS-PHASE LIQUID

NOTES

ALTERNATIVE 5 INCLUDES THE FOLLOWING:

1. DEED RESTRICTIONS
2. MULTILAYER CAP AT IR-01/21 AND IR-02 NORTHWEST
3. EXCAVATION AND THERMAL DESORPTION AND/OR SOLIDIFICATION/STABILIZATION TREATMENT OF IR-03 AND MISCELLANEOUS SOILS AND PLACEMENT AT IR-01/21 AND IR-02 NORTHWEST
4. SKIMMING AND OFF-SITE RECYCLING OF LNAPL AT IR-03
5. SHEETPILE WALL AND INTERCEPTOR TRENCH ALONG SHORELINE
6. ON-SITE PRETREATMENT OF COLLECTED GROUNDWATER AND DISCHARGE TO THE POTW
7. GROUNDWATER MONITORING

INSET

IR-52

400' 0 400' 800'
SCALE: 1" = 800'

DEPARTMENT OF THE NAVY — NAVAL FACILITIES ENGINEERING COMMAND
ENGINEERING FIELD ACTIVITY WEST
SAN BRUNO, CALIFORNIA
HUNTERS POINT SHIPYARD — SAN FRANCISCO, CALIFORNIA

FIGURE 5-4

SCHEMATIC DIAGRAM OF ALTERNATIVE 5

PARCEL E FEASIBILITY STUDY

PAREALTS.DWG - 12/23/97 - RAO - 069-005B0602

SEE INSET BELOW

IR-75
IR-76
PARCEL A
IR-74
PARCEL A
PARCEL C
IR-56
IR-72
IR-01/21
IR-04
AOC 13
PARCEL E
IR-12
IR-05
IR-36
IR-02
NORTHWEST
PARCEL D
IR-39
AOC 14
IR-02
CENTRAL
IR-13
IR-38
IR-03
IR-11/14/15
IR-54
AOC 15
IR-73
LNAPL SKIMMING AREA
AOC 16
AOC 17
IR-02
SOUTHEAST
SAN FRANCISCO BAY

250' 0 250' 500'
SCALE: 1" = 500'

EXPLANATION

- 600 — BUILDING OR STRUCTURE
- 518 — DEMOLISHED BUILDING OR STRUCTURE
- EXTENDED INSTALLATION RESTORATION SITE BOUNDARY
- PARCEL BOUNDARY
- EXISTING SHEETPILE WALL
- SHEETPILE WALL AND INTERCEPTOR TRENCH
- MULTILAYER CAP
- AREA CONTAINING SOIL TO BE EXCAVATED AND DISPOSED OF AT OFF-SITE LANDFILL

ABBREVIATIONS

LNAPL = LIGHT NONAQUEOUS-PHASE LIQUID
POTW = PUBLICLY-OWNED TREATMENT WORKS

NOTES

ALTERNATIVE 6 INCLUDES THE FOLLOWING:

1. DEED RESTRICTIONS
2. MULTILAYER CAP AT IR-01/21 AND IR-02 NORTHWEST
3. EXCAVATION OF IR-03 AND MISCELLANEOUS SOILS AND DISPOSAL IN OFF-SITE LANDFILLS
4. SKIMMING AND OFF-SITE RECYCLING OF LNAPL AT IR-03
5. SHEETPILE WALL AND INTERCEPTOR TRENCH ALONG SHORELINE
6. ON-SITE PRETREATMENT OF COLLECTED GROUNDWATER AND DISCHARGE TO POTW
7. GROUNDWATER MONITORING

INSET

IR-52

400' 0 400' 800'
SCALE: 1" = 800'

PAREALTS.DWG - 12/23/97 - RAO - 069-005B0602

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ENGINEERING FIELD ACTIVITY WEST
SAN BRUNO, CALIFORNIA
HUNTERS POINT SHIPYARD — SAN FRANCISCO, CALIFORNIA

FIGURE 5-5

SCHEMATIC DIAGRAM
OF ALTERNATIVE 6

PARCEL E FEASIBILITY STUDY

FIGURE 5-6
SCHEMATIC DIAGRAM OF ALTERNATIVE 7
PARCEL E FEASIBILITY STUDY

ANALYSIS OF INTEGRATION OF PARCEL E REMEDIAL ALTERNATIVES AND PARCEL F REMEDIAL ALTERNATIVES

THE ABOVE IDENTIFIED FIGURE IS NOT AVAILABLE.

EXTENSIVE RESEARCH WAS PERFORMED BY SOUTHWEST DIVISION TO LOCATE THIS FIGURE. THIS PAGE HAS BEEN INSERTED AS A PLACEHOLDER AND WILL BE REPLACED SHOULD THE MISSING ITEM BE LOCATED.

QUESTIONS MAY BE DIRECTED TO:

DIANE C. SILVA
RECORDS MANAGEMENT SPECIALIST
SOUTHWEST DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
1220 PACIFIC HIGHWAY
SAN DIEGO, CA 92132

TELEPHONE: (619) 532-3676

FIGURE 5-7
SCHEMATIC DIAGRAM OF ALTERNATIVE 8
PARCEL E FEASIBILITY STUDY

ANALYSIS OF INTEGRATION OF PARCEL E REMEDIAL ALTERNATIVES AND PARCEL F REMEDIAL ALTERNATIVES

THE ABOVE IDENTIFIED FIGURE IS NOT AVAILABLE.

EXTENSIVE RESEARCH WAS PERFORMED BY SOUTHWEST DIVISION TO LOCATE THIS FIGURE. THIS PAGE HAS BEEN INSERTED AS A PLACEHOLDER AND WILL BE REPLACED SHOULD THE MISSING ITEM BE LOCATED.

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1220 PACIFIC HIGHWAY
SAN DIEGO, CA 92132

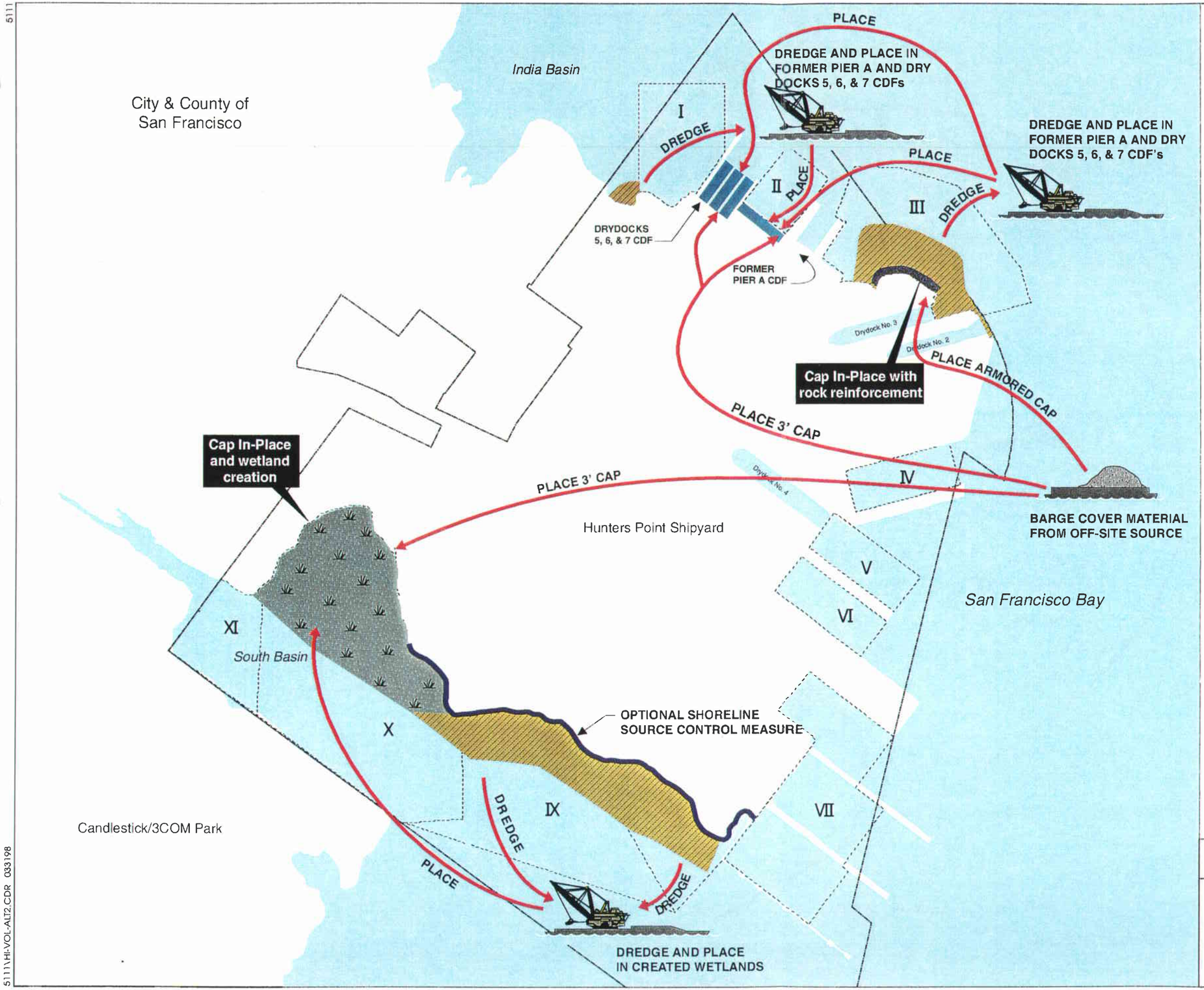
TELEPHONE: (619) 532-3676

ATTACHMENT B

PARCEL F REMEDIAL ALTERNATIVE FIGURES FROM THE DRAFT PARCEL F FEASIBILITY STUDY FOR HPS

Figure

5111



EXPLANATION

- Sediment removed by dredging
- Created wetland
- Confined Disposal Facility (CDF)
- Shoreline mitigative measures
- Process flow
- Armored Cap in-Place

DEPARTMENT OF THE NAVY — NAVAL FACILITIES ENGINEERING COMMAND

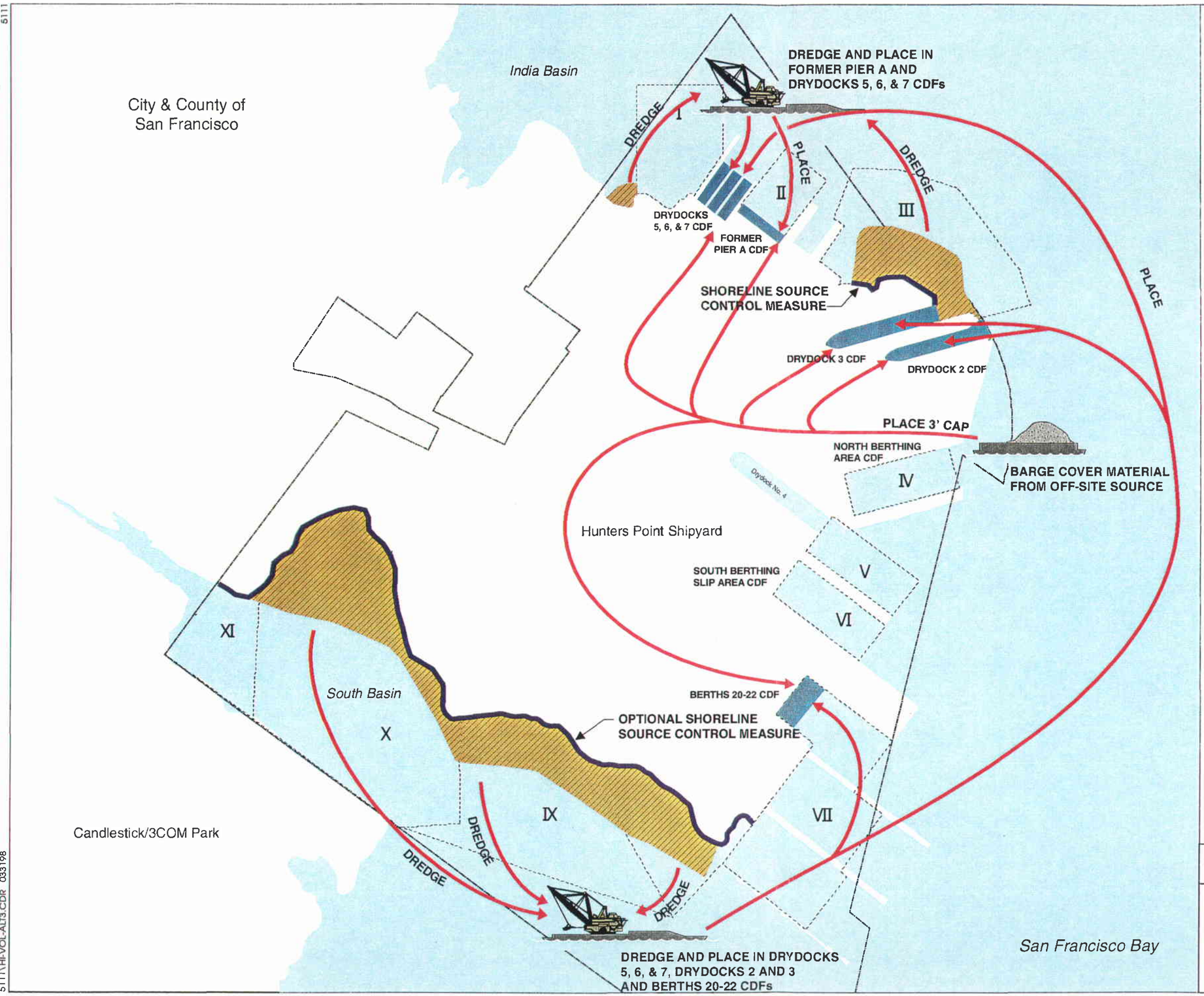
ENGINEERING FIELD ACTIVITY WEST

HUNTERS POINT SHIPYARD — SAN FRANCISCO, CALIFORNIA

FIGURE 5-2

ALTERNATIVE 2
HIGH VOLUME SCENARIO
PARCEL F FEASIBILITY STUDY

5111\HI-VOL-ALT2.CDR 033198



DEPARTMENT OF THE NAVY — NAVAL FACILITIES ENGINEERING COMMAND

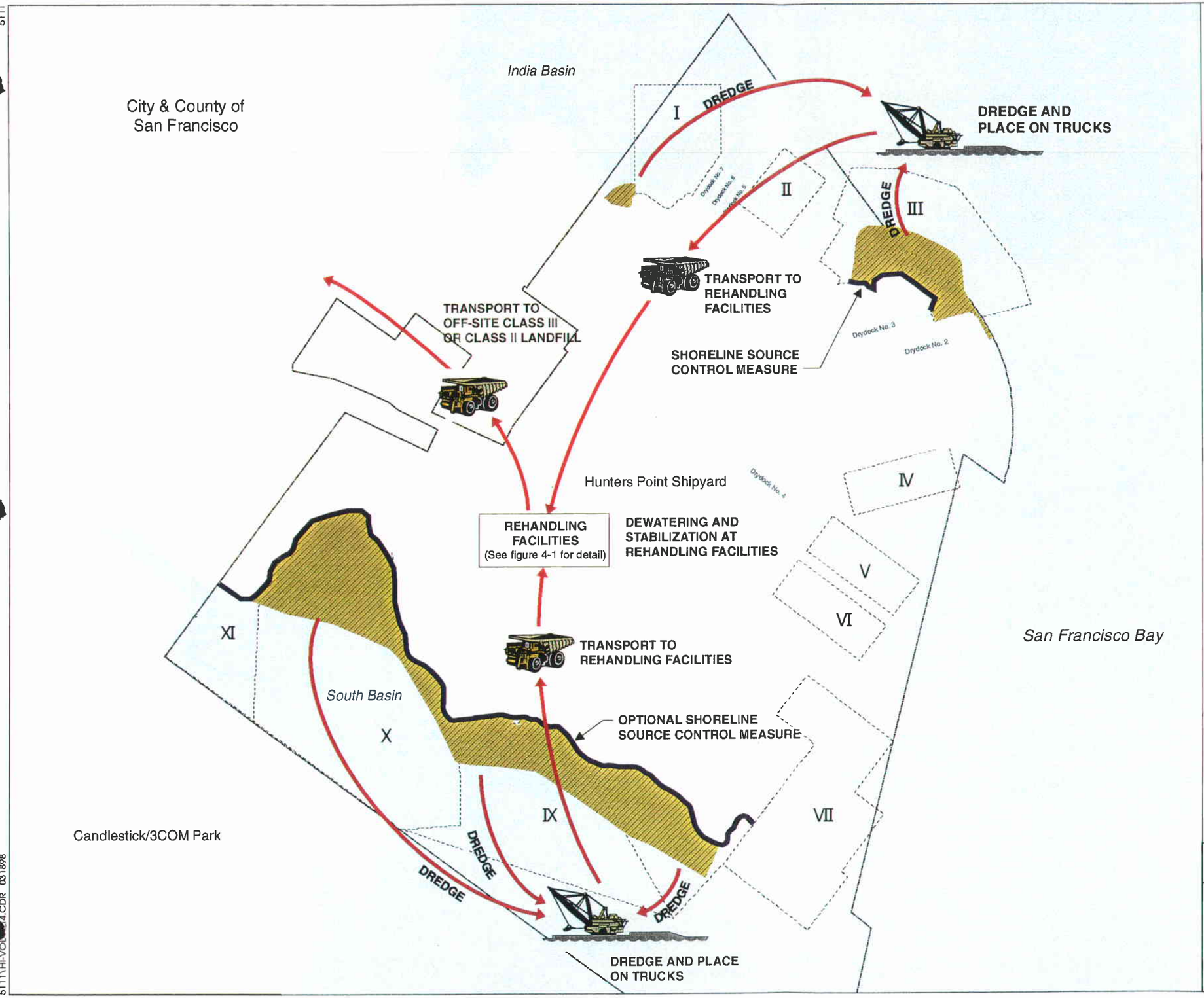
ENGINEERING FIELD ACTIVITY WEST

HUNTERS POINT SHIPYARD — SAN FRANCISCO, CALIFORNIA

FIGURE 5-4

ALTERNATIVE 3
HIGH VOLUME SCENARIO
PARCEL F FEASIBILITY STUDY

5111\HI-VOL-ALT3.CDR 033198



DEPARTMENT OF THE NAVY — NAVAL FACILITIES ENGINEERING COMMAND

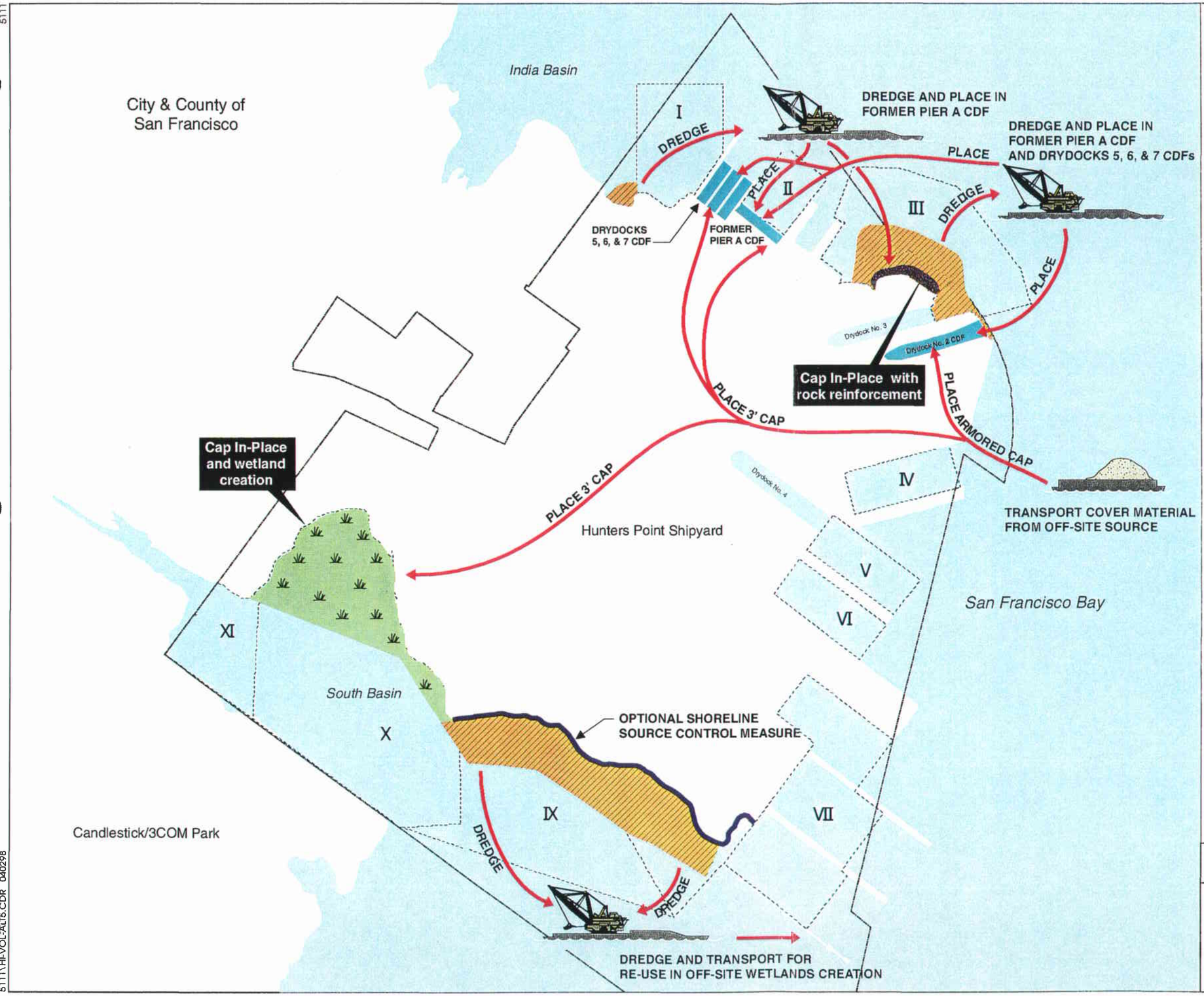
ENGINEERING FIELD ACTIVITY WEST

HUNTERS POINT SHIPYARD — SAN FRANCISCO, CALIFORNIA

FIGURE 5-6

ALTERNATIVE 4
HIGH VOLUME SCENARIO
PARCEL F FEASIBILITY STUDY

5111\HI-VOL4.CDR 031898



N

0 900 FEET

EXPLANATION

- Sediment removed by dredging
- Wetland
- Confined Disposal Facility (CDF)
- Shoreline source control measures
- Process flow
- Armored Cap In-Place

DEPARTMENT OF THE NAVY — NAVAL FACILITIES ENGINEERING COMMAND

ENGINEERING FIELD ACTIVITY WEST

HUNTERS POINT SHIPYARD — SAN FRANCISCO, CALIFORNIA

FIGURE 5-8

ALTERNATIVE 5
HIGH VOLUME SCENARIO
PARCEL F FEASIBILITY STUDY

TABLES

TABLE 1
PARCEL E ALTERNATIVES
HUNTERS POINT SHIPYARD

Alternative	Description	
	Soil	**Groundwater**
E-1	No action*	No action
E-2	• Multilayer caps over landfill/debris area and former oil reclamation pond area • Single-layer cap over remainder of Parcel E	• Sheetpile wall and slurry wall all around Parcel E
E-3	• Multilayer cap over landfill/debris area • Consolidation of soils near former oil reclamation ponds and encapsulation with sheetpile wall and multilayer cap • Excavation and use of various Parcel E soils as foundation material for multilayer cap at landfill/debris area	• Sheetpile wall and interceptor trench along shoreline • Discharge of collected groundwater to Bay or wetland • Encapsulation of areas of groundwater contamination • Groundwater monitoring
E-4	• Multilayer cap over landfill/debris area • Excavation of former oil reclamation ponds soils and disposal off site • Excavation and use of various Parcel E soils as foundation material for multilayer cap at landfill/debris area	• Sheetpile wall and interceptor trench along shoreline • Discharge of collected groundwater to Bay or wetland • Encapsulation of areas of groundwater contamination • Groundwater monitoring
E-5	• Multilayer cap over landfill/debris area • Excavation and treatment of former oil reclamation pond soils and various Parcel E soils and use as foundation material for multilayer cap at landfill/debris area	• Sheetpile wall and interceptor trench along shoreline • Pretreatment of groundwater and discharge to the publicly owned treatment works (POTW) • Groundwater monitoring
E-6	• Multilayer cap over landfill/debris area • Excavation of former oil reclamation pond soils and various Parcel E soils and disposal off site	• Sheetpile wall and interceptor trench along shoreline • Pretreatment of groundwater and discharge to POTW • Groundwater monitoring
E-7	• Multilayer cap over landfill/debris area • Excavation of former oil reclamation ponds soils and disposal off site • Excavation and use of various Parcel E soils as foundation material for multilayer cap at landfill/debris area	• Encapsulation of landfill/debris area with sheetpile wall • Excavation of saturated soils at areas of groundwater contamination and use as foundation material for multilayer cap at landfill/debris area • Dewatering of areas of groundwater contamination, pretreatment of collected groundwater, and discharge to POTW • Groundwater monitoring
E-8	• Multilayer cap over landfill/debris area • Excavation of former oil reclamation pond soils and various Parcel E soils and disposal off site	• Encapsulation of landfill/debris area with sheetpile wall • Excavation of saturated soils at areas of groundwater contamination and disposal off site • Dewatering of areas of groundwater contamination, pretreatment of collected groundwater, and discharge to POTW • Groundwater monitoring

**All* alternatives except No. 1 include installation of a multilayer cap at the landfill/debris area and establishment of deed restrictions.

TABLE 2
PARCEL F ALTERNATIVES
HUNTERS POINT SHIPYARD

Alternative	Description
F-1	No action
F-2	Areas VIII and IX: dredging and placement of dredge materials at Area X, cap, and wetland creation Area X: cap in-place and wetland creation Shoreline rehabilitation measures along Parcel E
F-3	Areas VIII, IX, and X: dredging and placement of dredge materials at confined disposal facility in other area Shoreline rehabilitation measures along Parcel E
F-4	Areas VIII, IX, and X: dredging, rehandling facility for dewatering on Parcel E and stabilization (if necessary), off-site disposal Shoreline rehabilitation measures along Parcel E
F-5	Area VIII and IX: dredge and off-site wetland creation Area X: cap in-place and wetland creation Shoreline rehabilitation measures along Parcel E

Note: Only the portions of the alternatives that are adjacent to Parcel E are presented. See the draft Parcel F feasibility study for the complete alternative description.

TABLE 3
COMPATIBILITY OF PARCEL E REMEDIAL ALTERNATIVES WITH PARCEL F REMEDIAL ALTERNATIVES
HUNTERS POINT SHIPYARD

Parcel E Alternatives	Parcel F Alternatives					Notes
	F-1	F-2	F-3	F-4	F-5	
E-1	Compatible/ Easy	Compatible/ Easily Implemented	Compatible/Easily Implemented	No/Difficult - sediment drying beds would be constructed on contaminated Parcel E soils	Compatible/ Easily Implemented	Potential migration of Parcel E contaminants and other offsite sources to Parcel F sediments and the Bay.
E-2	Compatible/ Easily Implemented	Maybe/ Moderate to Difficult	Maybe/Easily Implemented to Moderate compared to F-2 and F-5 (no onshore cap in place or wetlands creation)	No/Difficult - single layer cap would not allow for construction of drying beds for sediment	Maybe/ Moderate to Difficult	Coordination issues with shoreline related alternative. See note 1. Potential migration from other offsite sources to wetlands, Parcel F sediments, and the Bay.
E-3	Compatible/ Easily Implemented	Maybe/ Moderate to Difficult (less difficult than E-2)	Maybe/Easily Implemented to Moderate compared to F-2 and F-5 (no onshore cap in place or wetlands creation)	No/Difficult - Remedy for Parcel E would need to be complete or close to completion prior to starting Parcel F remedy	Maybe/ Moderate to Difficult	Coordination issues with shoreline related activities alternative. See note 2. Potential migration from other offsite sources to wetlands, Parcel F sediments, and the Bay.
E-4	Compatible/ Easily Implemented	Maybe/ Moderate to Difficult (less difficult than E-2, same as E-3)	Maybe/Easily Implemented to Moderate compared to F-2 and F-5 (no onshore cap in place or wetlands creation)	No/Difficult - Remedy for Parcel E would need to be complete or close to completion prior to starting Parcel F remedy	Maybe/ Moderate to Difficult (less difficult than E-2, same as E-3)	Coordination issues with shoreline related activities alternative. See note 3. Potential migration from other offsite sources to wetlands, Parcel F sediments, and the Bay.

TABLE 3 (Continued)
COMPATIBILITY OF PARCEL E REMEDIAL ALTERNATIVES WITH PARCEL F REMEDIAL ALTERNATIVES
HUNTERS POINT SHIPYARD

Parcel E Alternatives	Parcel F Alternatives					Notes
	F-1	F-2	F-3	F-4	F-5	
E-5	Compatible/ Easily Implemented	Maybe/ Moderate to Difficult	Maybe/Easily Implemented to Moderate compared to F-2 and F-5 (no onshore cap in place or wetlands creation)	No/Difficult - Duration of implementation would be extensive since Parcel E remedy is onsite treatment. Remedy for Parcel E would need to be complete or close to completion prior to starting Parcel F remedy.	Maybe/ Moderate to Difficult (less difficult than E-2, same as E-3 and E-4)	Onsite soil treatment and placement of treated soil at IR-01/21 and IR-02 prior to capping would lengthen the timeframe of remediation. Coordination issues with shoreline related activities alternative. See note 4. Potential migration from other offsite sources to wetlands, Parcel F sediments, and the Bay.
E-6	Compatible/ Easily Implemented	Maybe/ Moderate to Difficult (less difficult than E-2 and E-5, same as E-3 and E-4)	Maybe/Easily Implemented to Moderate compared to F-2 and F-5 (no onshore cap in place or wetlands creation)	No/Difficult - Remedy for Parcel E would need to be complete or close to completion prior to starting Parcel F remedy.	Maybe/ Moderate to Difficult	Coordination issues with shoreline related activities alternative. See note 5. Potential migration from other offsite sources to wetlands, Parcel F sediments, and the Bay.
E-7	Compatible/ Easily Implemented	Maybe/ Moderate	Maybe/Easily Implemented to Moderate compared to F-2 and F-5 (no onshore cap in place or wetlands creation)	No/Difficult - Remedy for Parcel E would need to be complete or close to completion prior to starting Parcel F remedy.	Maybe/ Moderate to Difficult	Coordination issues with shoreline related activities alternative. See note 6. Potential migration from other offsite sources to wetlands, Parcel F sediments, and the Bay.
E-8	Compatible/ Easily Implemented	Maybe/ Moderate to Difficult	Maybe/Easily Implemented to Moderate compared to F-2 and F-5 (no onshore cap in place or wetlands creation)	No/Difficult - Remedy for Parcel E would need to be complete or close to completion prior to starting Parcel F remedy.	Maybe/ Moderate to Difficult	Coordination issues with shoreline related activities alternative. See note 7. Potential migration from other offsite sources to wetlands, Parcel F sediments, and the Bay.

TABLE 3 (Continued)
COMPATIBILITY OF PARCEL E REMEDIAL ALTERNATIVES WITH PARCEL F REMEDIAL ALTERNATIVES
HUNTERS POINT SHIPYARD

Notes:

Are alternatives compatible? Compatible, No, Maybe
How difficult would it be to implement? Easy, Moderate, Difficult

1. Shoreline Issues for Alternative E-2 include: Sheetpile wall, multilayer and singlelayer cap, Parcel F cap in place and wetlands creation (alternatives F-2 and F-5 only), dredging, optional shoreline source control measures - would be best to design the alternative and conduct the remedial action together, or at least coordinate shoreline activities

2. Shoreline Issues for Alternative E-3 include sheetpile wall and interceptor trench, multilayer caps, Parcel F cap in place and wetlands creation (alternatives F-2 and F-5 only), dredging, optional shoreline source control measures - would need to design alternative and conduct the remedial action together, or at least coordinate shoreline activities

3. Shoreline Issues for Alternative E-4 include sheetpile wall and interceptor trench, multilayer caps, Parcel F cap in place and wetlands creation (alternatives F-2 and F-5 only), dredging, optional shoreline source control measures - would need to design alternative and conduct the remedial action together, or at least coordinate shoreline activities

4. Shoreline Issues for Alternative E-5 include sheetpile wall and interceptor trench, multilayer cap, Parcel F cap in place and wetlands creation (alternatives F-2 and F-5 only), dredging, optional shoreline source control measures - would need to design alternative and conduct the remedial action together, or at least coordinate shoreline activities

5. Shoreline Issues for Alternative E-6 include sheetpile wall and interceptor trench, multilayer caps, Parcel F cap in place and wetlands creation (alternatives F-2 and F-5 only), dredging, optional shoreline source control measures - would need to design alternative and conduct the remedial action together, or at least coordinate shoreline activities

6. Shoreline Issues for Alternative E-7 include sheetpile wall around IR-01/21 and IR/02, multilayer caps, Parcel F cap in place and wetlands creation (alternatives F-2 and F-5 only), dredging, optional shoreline source control measures - would need to design alternative and conduct the remedial action together, or at least coordinate shoreline activities

7. Shoreline Issues for Alternative E-8 include sheetpile wall around IR-01/21 and IR-02, multilayer caps, Parcel F cap in place and wetlands creation (alternatives F-2 and F-5 only), dredging, optional shoreline source control measures - would need to design alternative and conduct the remedial action together, or at least coordinate shoreline activities.

TABLE 3 (Continued)
COMPATIBILITY OF PARCEL E REMEDIAL ALTERNATIVES WITH PARCEL F REMEDIAL ALTERNATIVES
HUNTERS POINT SHIPYARD

Notes: (Continued)

Other items that may need to be considered but weren't included in evaluation:

A. Alternative F-2 - where the sediment from Areas VIII, IX, and X are dredged and placed in area X, capped in place, and then a wetlands will be created. The height of the wetlands will be high - and the combination of the Parcel E IR-01/21 and IR-02 cap would be high itself - so is a wetlands really possible?

B. Time duration was not considered to be an issue except for if the Parcel E soil was to be treated onsite and then placed on IR-01/21 and IR-02 Northwest - because that would impact the construction of the drying beds for the rehandling facilities, but time could be a factor in the other combinations as well.